The Builder

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TO ARTISTS.—The Council of the Art-Union of London offer a premium of ONE HUNDRED GUINEAS for a SERIES of DESIGNS, in outline, or outline slightly shaded, illustrative of Mr. Tennyson's poem, "The Idylls of the King;" size, 10 inches by 8. The number of the designs to be not less than twelve. Simplicity of composition and expression, severe beauty of form, and pure, correct drawing, are the qualities which the Council are anxious to realize in this series. If it should be deemed expedient to engrave the compositions selected, the artist will be expected to superintend the execution. The drawings, accompanied by a sealed letter, containing the artist's name, are to be sent in to the Office of the Society on or before the 30th of JUNE next, and they will be publicly exhibited. The Council reserve to themselves the right of withholding the premium if a work of adequate merit be not submitted.

GEORGE GODWIN, LEWIS POCOCK, } Honorary Secretaries.

444, West Strand, 10th January, 1860.

TO SCULPTORS.—The Council of the Art-Union of London offer a premium of SEVENTY GUINEAS for a GROUP or STATUETTE, to be subsequently executed in bronze or parian, representing some subject from English history. THIRTY GUINEAS will be awarded to the work which may be selected as second in merit. The premiums are to be competed for by finished models in plaster; the height of the figure when erect to be 20 inches. The models are to be sent in to the Office of the Society, on or before the 14th of JULY next, each accompanied by a sealed letter, containing the sculptor's name, and they will be publicly exhibited. The selected models, with copyright, will become the property of the Art-Union of London. The Council reserve to themselves the right of withholding either or both of the premiums, if works of adequate merit be not submitted.

GEORGE GODWIN, LEWIS POCOCK, } Honorary Secretaries.

444, West Strand, 10th January, 1860.

BUILDERS' BENEVOLENT INSTITUTION.—An ELECTION of Pensioners will take place in MAY next (1860). Candidates may obtain forms of application (to be returned on or before 24th FEBRUARY), at the Offices, 19, Southampton-street, Bloomsbury. Pensions, 24*l.* per annum for Males, and 20*l.* for Females. Subscriptions are earnestly requested, and will be thankfully received by the Treasurer, Mr. George Bird, 38, Edgware-road; the Secretary, at the Office; and the Bankers, Sir Samuel Scott, Bart. Cavendish-square. A. G. HARRIS, Secretary.

January, 1860.

SCHOOL for MECHANICAL ENGINEERING, and SCIENTIFIC EDUCATION, at the COLLEGE, Chester.

In addition to English and Mathematics, all the Pupils are taught Drawing suitable for the Architect or Engineer; and, in the Laboratory, the Principles as well as the Practice of Chemistry.

The Use of Tools, the Construction of Machinery, and the Principles of Mechanism may be studied in the various Workshops of the School.

French and German are taught to all who desire it, without any extra charge.

Chemical Analyses undertaken; Steam-engines and Machinery examined and reported upon; and Mechanism designed for special purposes.

For further particulars apply to the Rev. ARTHUR RIGG, Chester.

PROVIDENT INSTITUTION of BUILDERS' FOREMEN and CLERKS of WORKS.—The QUARTERLY GENERAL MEETING will be held at LYON'S INN, Newcastle-street, Strand, on WEDNESDAY next, JANUARY 18. The chair will be taken at EIGHT p.m. precisely.

JOHN LUCAS, Secretary.

PHOTOGRAPHIC EXHIBITION.—The SEVENTH ANNUAL EXHIBITION of the PHOTOGRAPHIC SOCIETY of LONDON is NOW OPEN at the Gallery, 5, Pall Mall East.

WORKMEN'S INSTITUTE and BENEFIT CLUB, 34, YORK ROAD, LAMBETH, S.—The Rules of the Benefit Club being now approved by the Registrar of Friendly Societies, it is proposed to open the Club, and a MEETING of workmen will be held on WEDNESDAY evening, the 18th inst. as above, at SEVEN o'clock, in order that the Members of the Society may appoint their Officers and Committee.

January 13, 1860.

COMPETITIONS.

TO ARCHITECTS. — CHESTERFIELD NATIONAL SCHOOLS.—Plans, with specifications, are required for the rebuilding of these Schools. The cost of the building, with offices, not to exceed 1,200*l.* It must be plain, containing two rooms, each for 240 children, and a class-room to each, and according to the plans of committee of council. A sketch of the ground may be obtained by application to the Rev. A. POOLE, Trinity Parsonage, Chesterfield, to whom plans may be sent, on or before the 1st of FEBRUARY next.—The managers intend to be at liberty either to give a premium of 10*l.* to the successful competitor, or to avail themselves of his services in carrying out his own plan.

Chesterfield, January 2, 1860.

BOROUGH of HALIFAX.—To LANDSCAPE GARDENERS and OTHERS.—The Corporation of Halifax, being the Burial Board, are desirous of receiving DESIGNS and ESTIMATES for LAYING OUT, DRAINING, and ORNAMENTING the LAND which they have purchased as a CEMETERY for the Borough. The designs must embrace,—

1. A ground-plan, showing the carriage roads and walks, the proposed general division of the Cemetery into two parts, and the subdivision of each into grave spaces, differing in size and value, the positions of the chapels, lodges, and other requisite structures, and the land to be set apart for ornamental planting.

2. Sections, showing the earthworks required for the re-arrangement of the surface, and the sizes, depths, and rates of inclination of the drains.

The area of the proposed Cemetery is within 20 acres. A premium of Twenty Guineas will be given for the design which, in the opinion of the Corporation, is the highest in merit, and a premium of Ten Guineas for the one which they consider second best, and both the premiated designs are to become the absolute property of the Corporation. The plans, estimates, and description (if any), must be distinguished by a motto or device, and be accompanied by a sealed envelope containing the name and address of the competitor, bearing a corresponding motto or device to that on the plans, &c. Each competitor is requested to state the terms on which he will superintend to their completion the execution of the works; and, if employed, the premium is to be merged in the sum paid for superintendence.—Lithographed plans of the site, with the levels shown in contours of 5 feet altitudes, may be obtained by application to the Town Clerk, on and after the 18th day of JANUARY instant, and the competing designs must be delivered at my Office in the Town-hall, Halifax, on or before MONDAY, the 13th day of FEBRUARY next.—By order of the Burial Board, EDMUND MINSON WAVELL, Town Clerk.

Town-hall, Halifax, 10th January, 1860.

CONTRACTS.

BURSLEM and TUNSTALL FREEHOLD LAND SOCIETY.—BASFORD ESTATE.—To CONTRACTORS. The Burslem and Tunstall Freehold Land Society are desirous of receiving TENDERS for the supply of GLAZED STONEWARE PIPES, and other articles; and also for the excavation and laying the Main Sewers, and for the formation and construction of the several Streets and Passages on the Basford Estate, Etruria, Staffordshire Potteries. Plans, sections, and specifications may be inspected at the Office of Mr. RALPH HALES, Engineer and Surveyor, Cobridge, on and after MONDAY, the 16th instant. Tenders, sealed and endorsed, to be sent to me on or before SATURDAY, the 4th FEBRUARY next.—By order, JOSIAH WOOD, Jun. Secretary.

Portland-street, Burslem, January 9, 1860.

BRADFORD CORPORATION WATER WORKS.—To EXCAVATORS, MASONS, and GENERAL CONTRACTORS.—The Water Works Committee of the Bradford Corporation will meet at their offices, in Bradford, on WEDNESDAY, the 1st day of FEBRUARY next, at TEN o'clock in the forenoon, for the purpose of receiving TENDERS or PROPOSALS for the following WORKS:—

CONTRACT M.—The EXCAVATING for, BUILDING, and COMPLETING of a portion of the MAIN AQUEDUCT or CONDUIT for conveying water to the town of Bradford, commencing at Sand-bed Beck, in the township of Burnsall, and terminating at the south end of a certain tunnel now in course of construction, called Barden Tunnel, in the township of Barden, with a certain BRANCH CONDUIT, in the township of Draughton; such conduits being of the aggregate length (including the laying of certain iron pipes for supplying the village of Burnsall, and about 675 yards of 24-inch pipes for crossing the valley of the Barden Beck) of about 7½ miles.—Plans and specifications may be seen, and further information may be had, on and after FRIDAY, the 13th instant, on application to Mr. JNO. W. LEATHER, Civil Engineer, Leeds.—By order,

W. H. HUDSON, Town Clerk,

Town Clerk's Office, Bradford, 9th January, 1860.

TO BUILDERS.—TENDERS are required for the ERECTION of a NEW FARM-HOUSE and BUILDINGS at Ingleby, Lincolnshire. Drawings and specifications may be seen at Mr. PAYNE'S, Saxilby, near Lincoln, to whom Tenders are to be sent on or before the 18th day of JANUARY, 1860. The lowest or any Tender will not necessarily be accepted.

CONTRACTS.

WAR DEPARTMENT CONTRACT.—NOTICE to BUILDERS.—TENDERS are required for the ERECTION of a NEW STAGE, with TWO CRANES, at the Royal Laboratory, Priddy's Hard, Gosport, in the county of Hants. Parties desiring to Tender for the erection of these works, must leave their names at the Royal Engineer Office, at Gosport, on or before the 16th day of JANUARY, 1860, and pay the sum of half a guinea for the bills of quantities, which will be forwarded to each party as soon as prepared by the Government surveyors.

Royal Engineer Office, Portsmouth, January 4th, 1860.

TO BUILDERS and OTHERS.—Persons desirous of submitting TENDERS for ADDITIONS, ALTERATIONS, &c. to the VICARAGE HOUSE, Stretton Sugwas, three miles from Hereford, are informed that they can see the plans and specifications at the Office of T. NICHOLSON, Esq. Diocesan Architect, Hereford. The Tenders are to be delivered to the Architect on or before the 24th inst. and no pledge is given that the lowest will be necessarily accepted.

LLANELLY HARBOUR IMPROVEMENTS.—To CONTRACTORS for WORKS.—The Commissioners are ready to receive TENDERS for the EXECUTION of a TIDAL RESERVOIR, of about 13 acres, with sluice gates; also culverts for diverting the Cilfé stream. The works comprise three contracts. The plans and specifications may be seen at the Harbour Office on and after the 20th day of JANUARY, 1860. Separate sealed Tenders for each contract to be sent in by the 2nd day of FEBRUARY, 1860. The Commissioners do not pledge themselves to accept the lowest or any Tenders.—For further particulars apply to J. R. LUCKRAFT, R.N. Harbour Master; or, R. W. JONES, Civil Engineer, Loughor.

Harbour Office, Llanelly, 3rd January, 1860.

PARISH CHURCH, STANTON-BY-DALE.—Persons desirous of offering TENDERS for the RESEATING and ERECTING a NEW CHANCEL ARCH, and other REPAIRS, to the above church, may see the plans and specification on application to the Rev. J. G. HOWARD, Stanton Rectory, from the 9th to the 24th instant, on which day Tenders must be sent in. Duplicate plans may also be seen at my Office. The committee do not bind themselves to accept the lowest Tender.

ROBERT BARBER, Architect.

Eastwood, Nottingham, January 3, 1860.

TO BUILDERS and OTHERS.—The Governors of the King School, Sherborne, are ready to receive TENDERS for the ERECTION of a new SCHOOL-HOUSE with Dormitories. The plans and specifications will lie for inspection in the School Library on and after MONDAY, JANUARY 16, and the Tenders are to be delivered on or before JANUARY the 30th, either to WILLIAN FFOOKS, Esq. or the Rev. H. D. HARPER. The Governors do not pledge themselves to accept the lowest or any Tender, and security will be required for the proper fulfilment of any contract that may be entered into.—For further particulars apply to the Rev. H. D. HARPER, King School, Sherborne; or to the Architect, WILLIAM SLATER, Esq. 4, Carlton Chambers, Regent-street, London.

POSTPONEMENT OF TIME FOR RECEIVING TENDERS.

MORETON-IN-THE-MARSH PARISH CHURCH.—BUILDERS willing to CONTRACT for a NEW TOWER and SPIRE to the above Church may see the conditions, specifications, and plans on and after MONDAY, the 19th of DECEMBER, between the hours of TEN a.m. and FOUR p.m. by application to T. COMMELINE, Esq. Moreton-in-the-Marsh. TENDERS (sealed, endorsed, and addressed to the Building Committee) to be delivered to T. COMMELINE, Esq. not later than TUESDAY, the 31st of JANUARY, 1860, at THREE p.m. The lowest or any of the Tenders not necessarily accepted. Information and bills of quantities can be obtained by applying to the Architects, Messrs. POULTON & WOODMAN, Reading.

TO BUILDERS.—Persons desirous of TENDERING for proposed ALTERATIONS and ADDITIONS to the VICARAGE HOUSE at Sutterton, near Boston, may see the plans and specifications at my Office, on and after the 10th instant. Sealed Tenders to be sent to me on the 25th, agreeably to the form supplied.

EDWARD BROWNING, Architect, Stamford.

Broad-street, Stamford, Jan. 4, 1860.

TO BUILDERS.—Persons desirous of TENDERING for the ERECTION of NATIONAL SCHOOLS for the parish of St. Michael, Stamford, together with a MASTER'S HOUSE and PLAY-GROUND FENCES, may see the plans and specifications at my Office, on and after the 16th instant. Sealed Tenders agreeably to the form supplied, to be delivered by SIX o'clock on the evening of the 1st of FEBRUARY next.

EDWARD BROWNING, Architect, Stamford.

Broad-street, Stamford, Jan. 4, 1860.

TO STATUARIES and MASONS.—Persons desirous of TENDERING for the EXECUTION of a MEMORIAL DRINKING-FOUNTAIN of Portland stone and marble, proposed to be fixed in the centre of the Market-place at Bourne, Lincolnshire, may see the plans and specifications at my Office. Sealed Tenders to be sent in on the 23rd instant, agreeably to the form supplied.—The lowest Tender will not necessarily be accepted.

EDWARD BROWNING, Architect, Stamford.

Broad-street, Stamford, 9th January, 1860.

WROUGHT-IRON BRIDGE.—TENDERS will be received by the undersigned, for the CONSTRUCTION of a LATTICE IRON BRIDGE, for Melbourne, Victoria, until TWELVE o'clock (noon) of FRIDAY, JANUARY 27th, 1860. Drawings and specification may be obtained on and after FRIDAY, 20th inst. at the Office of HENRY CARR, Esq. 4, Victoria-street, Westminster Abbey, S.W. to whose care the Tenders are to be addressed. The charge for drawings and specification will be one pound. They will be sent by post on receipt of post-office order for twenty-two shillings. The lowest or any Tender not necessarily accepted. To be marked outside "Tender for Yarra Bridge." W. L. STONEY.

[*For remainder of Contracts see next page.*

CONTRACTS.

METROPOLITAN BOARD of WORKS.—MAIN DRAINAGE of METROPOLIS, MIDDLE-LEVEL SEWER. — To BUILDERS and CONTRACTORS experienced in TUNNEL WORKS.—The Metropolitan Board of Works hereby give notice that they will meet in the Council Chamber, Guildhall, in the City of London, on FRIDAY, the 17th day of FEBRUARY next, at TWELVE o'clock at noon precisely, and will then be prepared to open TENDERS by parties who may be willing to CONTRACT for the CONSTRUCTION of MAIN BRICK SEWERS, 12 miles, 1,280 feet in length, or thereabouts (33,862 feet of this length being in tunnel), and for the EXECUTION of other WORKS in connection therewith, to extend from a point between the Northern High-Level Sewer, east of Sir George Duckett's Canal and the Western Arm of the Counter's-creek Main Sewer, near Kensal-green, in the county of Middlesex. Parties desirous of submitting Tenders may, upon payment of 3l. obtain plans, sections, specification, form of Tender, and other particulars, on application to Mr. J. W. BAZALGETTE, Engineer of the Board, at the Office of the Board, between the hours of NINE a.m. and FOUR p.m.—Tenders, addressed to the Metropolitan Board of Works, must be delivered at the Office of the Board, No. 1, Greek-street, Soho, before FOUR o'clock p.m. on THURSDAY, the 16th day of FEBRUARY next, and no Tender will be received after that hour. The Board do not bind themselves to accept the lowest or any Tender, and the party whose Tender shall be accepted will be required to provide two approved sureties for the due performance of the works. JOHN POLLARD, Clerk of the Board.
No. 1, Greek-street, Soho, January 9, 1860.

CONTRACT for Wrought-Iron GIRDERS. VICTORIAN RAILWAYS.—TENDERS are invited for the IRON-WORK of the TARADALE VIADUCT, about 630 feet long.—Specifications may be procured at our Office, 4, Abchurch-lane, on and after MONDAY, the 9th instant; and drawings may be seen, and further information obtained, at the Office of the Engineer, R. P. BRERETON, Esq. 18, Duke-street, Westminster. Sealed Tenders, endorsed, "Tender for Taradale Viaduct," are to be addressed to us, and delivered at our Office before THREE o'clock on WEDNESDAY, the 18th instant. We do not bind ourselves to accept the lowest or any Tender. Any written application for specifications must be accompanied by 5s. in postage stamps. DE PASS & SONS.
January, 1860.

TO BUILDERS and OTHERS.—SAINT MARY, ISLINGTON, in the COUNTY of MIDDLESEX.—METROPOLIS LOCAL MANAGEMENT ACT. — Notice is hereby given, that a Committee of the Vestry will meet at the Vestry Offices, Upper-street, on WEDNESDAY, the 25th day of JANUARY, 1860, at TEN o'clock in the morning precisely, to receive TENDERS for the DAY and JOBBING WORKS in connection with the construction and repairs of Sewers and Gullies. The form of Tender and Contract which alone will be received may be had at the above Office, on payment of 2s. 6d. Sealed Tenders must be sent in on or before TEN o'clock on the day above mentioned. Persons tendering should be in attendance at the meeting of the Committee. The Vestry do not bind themselves to accept the lowest or any Tender.
JOHN LAYTON, Vestry Clerk.
Vestry Offices, Upper-street, 12th January, 1860.

TO CONTRACTORS.—The Bristol and Forest of Dean Coal Company, Limited, are prepared to receive TENDERS to continue the SINKING of TWO SHAFTS at the Princess Royal Colliery, in the Forest of Dean. These shafts are already sunk about 90 yards, and there is ample pumping and winding power. Tenders to be delivered at the Offices, 6, Bridge-parade, Bristol, on or before the 24th instant. B. D. COLLENS, Managing Director.
Bristol, January 11, 1860.

SAINT JOHN, HAMPSTEAD.—ROAD MATERIALS.—The Vestry of the Parish of Saint John, Hampstead, are ready to receive TENDERS for a SUPPLY of the following ROAD MATERIALS, viz.:—270 cubic yards (more or less) of broken GUERNSEY GRANITE, to be delivered in the Finchley New-road, Saint John's-wood, between the Boundary-road and the Swiss Cottage, and 860 cubic yards (more or less) of broken MARKFIELD GRANITE, to be delivered in the Adelaide-road North, North End-road, Finchley New-road, between the Tollgate and the North Star and Upper Avenue-road, Saint John's-wood, all in Hampstead Parish. The above-mentioned Materials are to be delivered on or before the 25th of MARCH next. Also for the SUPPLY of the following ROAD MATERIALS, to be delivered at such places, within the said Parish, in such quantities and at such times, between the date of the Contract and the 25th of MARCH, 1861, as may from time to time be directed, viz.: broken Kentish Rag Stone, screened Stone Gravel, screened Hoggin, screened Shingle, screened Hard Core and Brick Rubbish, Dorking Lime, Blue Lias (ground) Lime, Thames Ballast, and sharp Thames Sand. All the Materials to be of the best quality. Tenders, specifying the price per cubic yard of all or any of the above-mentioned Materials, distinguishing the price (except as to granite) for delivery at the Wharf, and the price for delivery at any part of Hampstead Parish west of the Finchley and Avenue Roads, and at any part of the parish east of the last-mentioned roads, including the Town of Hampstead, are to be sent under cover, endorsed "Tender for Road Materials," to me, on or before MONDAY, the 23rd of JANUARY instant, after which day no Tender will be received. The Vestry do not pledge themselves to accept the lowest or any Tender. The Contractor will be required to execute a written contract, and to enter into a bond with two sufficient sureties in 500l. for the due performance of the Contract. The Form of Contract may be seen at the Surveyor's Office, No. 10, New-end, Hampstead, where further particulars may be obtained.—By order,
THOMAS TOLLER, Vestry Clerk.
Vestry Offices, Hampstead Workhouse, January 12, 1860.

TO SURVEYORS.—The Local Board for the district of the Borough of Wrexham, in the county of Denbigh, do hereby give notice that they are prepared to receive TENDERS for a complete SURVEY and PLANS of the district of Wrexham. The specification and specimen plans may be seen, and forms of Tender may be obtained, at the Office of the Local Board on and after MONDAY, the 2nd day of JANUARY, 1860.—Sealed Tenders, endorsed "Tender for Survey," must be delivered at the Office of the Local Board on or before MONDAY, the 13th day of FEBRUARY, 1860. JOHN JAMES, Clerk to the Local Board.
Office of the Local Board, Wrexham, 28th December, 1859.

ON VIEW at Messrs. GEORGE TROLLOPE and SON'S, 15, PARLIAMENT-STREET (SOLE AGENTS), Specimens of the rich PARQUET FLOORS and BORDERS recently laid by the LONDON PARQUETRY WORKS in the Drawing-room, Dining-room, Mineral and Ante Rooms, in the mansion of the late — Houldsworth, esq. Glasgow, from the designs of J. Thomas, esq. Architect; also Specimens of Mosaic Damask and other Parquet Floors and Borders.—For designs and estimates, apply to Messrs. GEORGE TROLLOPE & SON, or (by letter) to THE LONDON PARQUETRY WORKS, Victory-place, Camberwell.

BUILDERS, CARPENTERS, and OTHERS requiring TEMPORARY CASH ACCOMMODATION, without expense of mortgage or life assurance, are solicited to peruse the system of business adopted by the Finsbury Bank, 144, St. John-street-road, E.C. Established in 1838.—All communications and business transactions strictly confidential. Prospectuses forwarded.

IMMEDIATE CASH ADVANCES, MONEY ADVANCED on Warrants, Freehold, Leasehold, and Copyhold Property, Bills of Sale, and other approved securities; Balance Sheets prepared, Businesses disposed of, Partnerships negotiated, and all other matters connected with accountancy promptly attended to, by Mr. R. CROSSLEY, Accountant and Business Agent, 17, Moorgate-street, Bank, E.C. Country commissions executed.
Personal interviews free of charge.

NOTICE of DIVIDEND.—BANK of DEPOSIT (Established A.D. 1844), No. 3, Pall-mall East, London, S.W.—The WARRANTS for the HALF-YEARLY INTEREST, at the rate of 5 per cent. per annum, on Deposit Accounts, to the 31st DECEMBER, are ready for delivery, and payable daily, between the hours of TEN and FOUR.
PETER MORRISON, Managing Director.
January 10, 1860.
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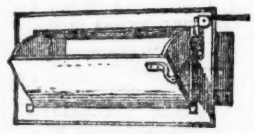

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TO CONTRACTORS, ENGINEERS, AND OTHERS.
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Nail Manufacturer and General Factor, BIRMINGHAM; and 16, Gresham-street, London, E.C.

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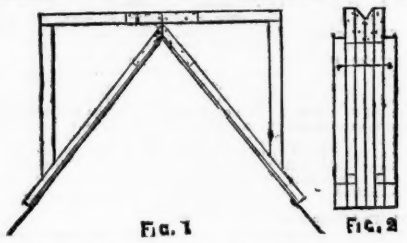

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VOL. XVIII.—No. 884.

The Repairs of the "Hanging Ruins" at Lindisfarne.

THE counties of Northumberland and North Durham, so often pillaged, and ravaged by fire and sword, are, as may be supposed, pre-eminently rich in ruins. These are not confined to any particular period. There are the deserted and silent camps of the ancient Britons,—bleak places out on hill tops with sweeping command over miles of the neighbouring country; buried Roman cities; the great solemn Roman wall; border castles, Norman and Edwardian; peel towers; and religious edifices of various descriptions. In the foreground of these, in point of consequence and interest, stand the remains of Lindisfarne Priory, to which attention has been recently drawn in our pages. This sombre and massive pile is built on a semi-island, which is twice a-day cut off from the shore by three miles of ocean-billows; and twice a day left in communication with it across three miles of sea-weed dotted sands. About six miles southwards are the Farne Islands, looking in the distance like so many black-backed monsters of the deep sunning themselves on the surface of the waters. These islands in old times were the scene of many a straightened page in hermit life; and in modern days are more luminous still with the memory of the bright example and heroic bravery of Grace Darling. On the margin of the shore, towering upon a huge basaltic rock, stands Bamborough Castle, the residence, in the days of the Saxon heptarchy, of the kings of Northumbria. The proximity and consequent military protection afforded by this regal fortress are supposed to have influenced Aidan, the first bishop of Lindisfarne, in his choice of this very secluded site; and the great facilities afforded by its frequently inaccessible position for those essentials of monastic life, retirement and contemplation, have also been assigned as reasons for the selection.

King Oswald, the founder of the see of Lindisfarne, is mentioned in terms of the warmest commendation by Venerable Bede. During his reign the land flourished in peace and plenty; and after his death his good influence was enjoyed by his subjects, for he was canonized, and many cures were effected at his tomb. The monks on the island pursued the same pious and actively benevolent career. Their renown speedily became so great, that Ceolwolphus, a successor of King Oswald, resigned his crown to become a monk of Lindisfarne. This prince bestowed so many kingly treasures upon the monastery, and endowed it with such large possessions, "that he seemed rather to resign his kingdom to the church than to his successor. He was doubtless a welcome man to that monastery," continues a quaint authority of King Charles's time, "for, for his sake, it was granted the monks to drinke wine and ale, who before were only to drinke milke and water." But the chief fame of Lindisfarne is based on the memory of St. Cuthbert. For twelve years he bore the dignity of priorship, when, leaving all things in order, and a cathedral church, built of wood and thatched with weeds, in full operation, he retired to a hermitage he made for himself on Farne Island. In this seclusion, with no eye for a witness, he is said to have performed miracle after miracle. He touched the rocks, and water flowed forth (singularly enough, more profane mortals at this day find water on digging up a few spadefuls of earth); and the ground brought forth corn without tillage. His sanctity and austerity won him many admirers; the holy Tuda sent him a stone coffin; and the Abbess of Tynemouth presented him with a linen winding-sheet. On his death-bed he conjured the monks not to leave his remains to the mercy of the fiery Danes; but, in case of invasion and consequent flight, to carry these with them. It was this singular behest that laid the foundation-stone of the immense fortune of the see of Durham. For when the faithful monks opened the saint's coffin, with the intention of placing his bones with their other relics, his body was found to be uncorrupted; and from that time ensued a series of miracles, that drew, for many centuries, kings, queens, nobles, and foreign potentates to his shrine; all of whom vied with each other in the magnificence of their offerings.

The Danish invasion, prophetically anticipated by the saint, soon came to pass; and the monks, having previously piled all their valuables into his coffin, took refuge in flight. The Danes landed: they found nothing but a deserted monastery and an empty church; which they set fire to and retired. The abounding wild fowl must have been left in possession of the island for many years; the seals must have basked on the limpet crusted rocks, watching the green waves tossing their white manes, for many seasons; and the cormorants have reared many generations of their ugly nestlings, with nothing, save the rumble and splashing fall of the breakers as they lashed the island at every tide, to disturb them; for a century and more elapsed before the community was re-established. The wanderings of the monks with their illustrious burden are minutely given by Bede. Suffice it for us to say, that they turned their steps first to Scotland, then attempted to cross to Ireland, but finally settled down at Chester-le-street, about the time of King Alfred the Great.

After a long repose of 115 years, the saint intimated to the bishop (who was schoolmaster to Edward the Confessor) that he wished to return northwards. Peace having asserted her reign once more, the monks, in accordance with this desire, prepared to return to Lindisfarne. Arriving, after much fatigue and many adventures, at Durham, one of the brethren received a supernatural communication from the saint, to the effect that he decided to remain there. All intentions of continuing their route were immediately abandoned; and a temporary shrine was made of branches and boughs of trees to receive their burden during the erection of a building more in accordance with his miraculous consequence. This circumstance, taken in connection with the exact correspondence of their respective details, links the dates of Lindisfarne Priory and Durham Cathedral. When finally deposited in a marble sepulchre in the latter edifice, the shrine of St. Cuthbert was rendered the most gorgeous of any in the kingdom. His strong aversion to women was humoured to the full, and a particular line in the pavement of the cathedral indicated the distance they were to keep from his remains. At Lindisfarne this exclusion was carried still farther; and a separate church was built expressly for women. He was not so unrelentingly severe on every score, for Reginald, the monk of Durham, writing about the rebuilding of Lindisfarne at this period, tells us that the tired and thirsty country people, piously conveying the stone in wains and carts from Cheswick beach to the island, were regaled with the contents of a cup which was never once replenished by mortal hand!

From the varied items mentioned in the annual account rolls the Lindisfarne monks were required to send to Durham, we may picture their simple daily life—how they went fishing and brewing, see how much they gave for a new boat, or how much they expended in repairing the malt-house; and we may even learn the number and names of the missals in their scanty library. For more architectural details, Britton, in his "Antiquities," &c., has given three excellent engravings of the priory. But for more recent representation of the island, showing church, priory, and castle, with the silvery light on the wide wet sands, we must look to Fenton's photographs. The fine old "hanging" Norman arch which spans the tower from angle to angle is faithfully rendered, as is that probable mystification of future enthusiastic, but unlearned tourists,—the late reparation.

It is highly commendable on the part of the Commissioners of Woods and Forests to recognize the right Posterity has to have sight of such interesting remains. If Time's corroding hand should be unstayed, Posterity would certainly lose so much of his inheritance, as the delight the contemplation of the works of such remote ages must ever afford; but because of the intangibility of the charm of these treasures, let especial care be taken. The feeling in favour of the strict preservation of every feature and every stone in these legacies from the past is so strong that directly a ruin is touched everybody makes it his business to keep his eye upon it. Attention has lately been called to the rough handling of Lanercost Priory, and the demolition of ancient towers at Alnwick, and it behoves us to plead in time for the more ancient and precious remains on Holy Island. What has already been done there may be briefly described thus:—The *inner segmental arch* of the decorated window at the east end,—

> "That portion of the pile
> Rebuilded in a later style,"

which

> "Showed where the spoiler's hand had been,"

has been rebuilt. It stands out in bare relief against the sky, without the symmetrical outline of an outer pointed arch, or mullions, or tracery, and appears to be an unlovely attempt to repeat the effect of the celebrated hanging ruins over the tower. The intention might have been to conceal tie-rods by which to bind the two side walls together; but the effect produced is certainly an appearance of thrusting the walls outwards. For the rest, compo' has been laid on the tops of the walls to keep the rain and damp out, and stray stones, gathered together, and eked out by bran new ones of joiner-like smoothness of finish, have been rebuilt in their old places,—the new stones presenting a painful contrast to the old masonry fretted to honeycomb by "the sea-breeze keen," which—

> "Had worn the pillar's carving quaint,
> And moulder'd in his niche the saint,
> And rounded with consuming power
> The pointed angles of each tower."

The fears of our correspondent, respecting the probable roofing in of the building, must be groundless. Many of the pillars are scarcely above ground; and quite one-half of the church would have to be rebuilt. If, therefore, it has taken, as we have been informed, seven or eight hundred pounds to make the slight repairs just enumerated, the cost of re-roofing would be some thousands, and no counterbalancing advantages would be obtained; for the church built contiguous to the priory for women (who, it will be remembered, were not permitted to approach St. Cuthbert's shrine), is still in existence, and in use, as the parish church for the residents on the island. As additional evidence of the unlikelihood of further accommodation being required by the scanty congregation, we may mention, that although this structure is in bad repair, the high pen-pews rotten, and strewed with straw, farmyard fashion, nothing could have been done for it, owing to the poverty of the population (composed for the most part of men who go down to the sea in ships), had not the rural dean received a grant from the Dean and Chapter. With the sum thus obtained, we

are happy to be able to add, it is about to be put in something like decent order.

From the reports in the local papers we glean that the day, on which the northern antiquaries made their pilgrimage to the island, was miserably wet; that the rain fell in torrents; that the only means of conveyance from the railway station to the ferry, a distance of five miles, was, by an undignified, though laughter-moving, jolting along a most unfrequented road, in an uncovered cart. Hence, we must not be considered uncharitable if we come to the conclusion, that the favourable criticisms passed upon the reparations by various members of the society, must have been due to the *couleur de rose* medium through which they made their investigations when seated before the blazing fire, and the substantial luncheon hospitably provided for them at the castle. The wet aspect of the ruins could hardly have conduced to the complimentary opinions formed of the repairs.

It is desirable, now, to leave the venerable pile alone, as far as additions go; to look occasionally to the cement on the tops of the walls, to see whether it is answering the purpose of keeping out the damp; to prevent the grass from growing over the bases of the ruined pillars and fragments of carved stone still strewn about; and to keep tourists from doing further damage,—either in the way of taking away specimens, or of carving their initials. The last time we visited the island, we waded through the grass, fast fading into hay, to find the fragments of the Saxon cross with its basket-work and sculptured devices. They are invaluable as a link in our short chain of Saxon antiquities. But the long grass would not disclose its secret.

There are men upon the island, officers of the coast-guard and others, who take a proper pride in

> "The castle and its battled walls,
> The ancient monastery's halls
> (A solemn huge and dark red pile
> Placed on the margin of the aisle),
> With massive arches broad and round
> That rose alternate row and row
> On ponderous columns short and low,
> Built e'er the art was known
> By pointed aisle and shafted stalk
> The arcades of an alley'd walk
> To emulate in stone."

But good-will and commensurate means do not always go hand-in-hand. If the commissioners would set apart a small annual sum, and appoint a permanent custodian, the ruins would be spared any further devastation, and future generations would be secured one of the most interesting historic and archæological studies in our English land.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE ordinary meeting was held on Monday last, at the house in Conduit-street; Mr. George Godwin, V.P., in the chair.

Several contributions to the library were announced, and thanks voted to the donors. Mr. F. P. Cockerell, of Carlton-chambers, Regent-street, and Mr. E. B. Keeling, of 3, Upper-terrace, Islington, were elected associates.

Mr. C. H. Hayward, referring to the recent question raised before the county justices at the Shire Hall, Norwich, mentioned elsewhere in our present number, as to whether an architect was entitled to regard as his own and retain in his possession the plans and drawings prepared at the request of his client (Mr. Welsby, Q.C., having decided, in a case referred to him touching the county surveyor, that he was not), asked whether it was the intention of the Royal Institute of British Architects to take any steps in the matter?

Mr. A. Ashpitel observed that in a case in which the question was raised by Sir Morton Peto, the eminent contractor, it was decided that the drawings belonged to the architect.

Professor Donaldson was of opinion that, as an architect could not recover commission on the cost of the building at law, but was obliged to charge for the drawings, the drawings prepared to carry out the design were the property of the client employing the architect.

Mr. Jennings was of opinion that where architects were employed to carry out the works they ought not to make a charge for the drawings.

Mr. Charles Barry said he was forced to dissent from the views held by Professor Donaldson and Mr. Jennings, as he was of opinion that drawings were in all cases the property of the architect.

The Chairman said that, as two papers were to be read that evening, it might be inconvenient to prolong the discussion. The subject was undoubtedly of great importance as regarded the general body of architects and the public; and it was his intention to move that a committee be appointed to take the subject into consideration. He differed altogether from Professor Donaldson, maintaining that the drawings were simply the architect's tools and remained his property. An architect was paid for designing and superintending a building, not for making drawings.

Mr. Robert Kerr said he wished to call attention to the Manchester Academy of Fine Arts. Many years since an academy had been established in London, and subsequently in Dublin; but the requirements of art had increased to such a degree that similar institutions were needed at Liverpool, Birmingham, and Manchester. It was now proposed to establish an academy at Manchester in connection with the Manchester Royal Institution; and, as architecture was not to be excluded, as it had been at Liverpool and Birmingham, he ventured to hope that, if convenient, gentlemen would contribute drawings to the exhibitions whenever they should be held. He was sure that the academy would be conducted with spirit, and in a proper manner, and he hoped it would succeed.

The Chairman said the meeting was indebted to Mr. Kerr for having brought so interesting a subject under their notice, and he willingly supported his request.

Mr. G. R. Burnell then read a paper, entitled "Sixty Years since; or, Improvements in Building Materials and Construction during the present Century," which we have printed in full.

During the reading of the paper, Mr. Burnell took occasion to refer to the disaster which had happened to the *Royal Charter* in October last, in Moelfre Bay, and stated that he had arrived at the conclusion that the vessel broke in pieces because the iron used in her construction was not of the best material, and that she parted from her anchors because the cables were not made of the requisite metal. Having some years ago been brought into connection with the iron trade, and having had opportunities of examining the quality of iron used ten years ago, he was in a position to state that it was immensely superior to that in ordinary use at present. The question was one which materially affected the character of manufacturers; and, with regard to the safety of ships, it was of such paramount importance to the public, that he considered it to be the duty of some constituted authority to interfere actively in the matter.

At the suggestion of the Chairman, it was agreed that the next paper should be read, and that the discussion should be taken upon the two.

Mr. James Edmeston then read some notes on the use of zinc in roofs, and the cause of failure therein, the pith of which will be found on another page.

Mr. Ashpitel inquired of Mr. Edmeston whether it was true that many of the public buildings of Paris were covered with zinc. He understood that, at the New Palace of the Louvre, the Rue Rivoli, the Boulevart Sebastopol, and other places, it was extensively used.

Mr. Edmeston said that was so. His examination, however, had rather been directed to old than new buildings. Zinc was used in Paris in preference to any other material for the covering of roofs.

Mr. Burnell said that some twelve or fourteen years ago he had inquired into the subject in France, and found it was the practice to use zinc in preference to any other material for roofs, and it was quite possible that in the atmosphere of France it might be the best thing to use. He differed, however, from Mr. Edmeston with regard to the effect of the sea air upon the metal, as his experience went to show that sea air caused decomposition. With regard to the use of zinc for ships' bottoms, it seemed to him that a more dangerous material could not be used for the purpose, and he believed that ship-builders had given it up, except perhaps those whose only desire was to turn out cheap ships irrespective of the consequences. He thought that architects as a body of constructors ought to be careful before they consented to use zinc to a large extent. The great difficulty in the way of its more general use appeared to be in getting the metal pure, as it was generally found mixed with lead or iron. He had himself seen lead and zinc in a mine where the lodes crossed each other. In an atmosphere such as that of London, where a great quantity of coal was used, the admixture of lead or iron generally acted upon the zinc as a decomposing agent. He was quite prepared to believe that zinc might answer at Paris or at Munich, but he scarcely thought it could be brought into general use in London. Mr. Edmeston had stated that the chemical action might take place when the metal came in contact with oak or chesnut timber, but he (Mr. Burnell) certainly never saw chesnut wood used, though he was aware that when zinc and oak came in contact decomposition took place. In London dripping eaves or gutters were not so usual as the box or trough gutter; and in forming the right angles of the latter in zinc, the zinc generally cracked, and decomposition ensued. He confessed that on the whole his own experience had not led him to look favourably on the general introduction of zinc into this country.

Mr. Morris called attention to a water-colour drawing of the interior of the Corn Exchange in Mark-lane, which had been designed by him twenty years ago. The corn factors had previously met in an open area; and, when the new Exchange was contemplated, they expressed a desire to be protected from the weather, and to assemble for the future in a building thoroughly well ventilated, but with a means of escape for the dust blown away from the corn. In order to meet these requirements he suggested a perforated dome, which was found to give entire satisfaction. It was found necessary to make that dome of some light and at the same time permanent material. To insure that object, zinc of 18 ounces to the foot, with gutters of 8 lb. lead, were used, and the roof had remained ever since without alteration, and without repair. A portion of the building was subsequently disturbed by fire, but the dome (which was the work of the late firm of Locke and Nesham) remained intact to the present, and had not to his knowledge been subjected to any repair.

Mr. I'Anson bore testimony to the durability of zinc as a covering material, when properly manufactured and carefully laid. He had himself visited the Vieille Montagne works, where the manager had got into a violent passion with him, because in England zinc had not been tested under circumstances favourable to the development of its merits. He had been told that the reason zinc failed in England was, that we did not use it of the proper thickness. The manager at the Vieille Montagne works assured him that 21-ounce zinc was required, and that when used of that thickness it would be found to oxidize very rapidly, and that the result would be the deposit of a permanent oxide which would coat the zinc at both sides, and thus make the substance harder and more enduring. He (Mr. I'Anson) had used it in the most smoky parts of London for the last twenty years, and he was bound to say that he had found it to answer the purpose very well. There was, however, a difficulty in getting the metal pure.

Mr. Edmeston said that the old roof of the Palais de Justice at Paris was laid in zinc, and, as he understood, had never been repaired. With regard to the sheathing of ships with zinc, he was not in a position to speak from personal observation, but he had been informed that zinc sheathing lasted as long as copper (which was far more expensive); but that in certain places where barnacles existed, it had been found that the animals would stick to the zinc and not to the copper. He was aware that it was objected to zinc, that it cracked in the working; but he was persuaded that if the metal was pure it would be found as plastic as lead, which did not crack.

Mr. Austin said that in cases where he had used zinc, near Canterbury, he had never made the price of the material an object, and that notwithstanding he had been furnished with zinc which had failed.

Mr. Jennings observed, with reference to the paper read by Mr. Burnell, as well as to that read by Mr. Edmeston, that it was most desirable that architects should have the means of testing the quality of the materials used. It seemed to him that the new woods to which Mr. Burnell had called attention, and specimens of which he had exhibited, were not very suitable to architectural purposes, although they might do very well in engineering. With respect to zinc, he had tried it with varied effect; for in some cases it had succeeded, while in others it had failed. He agreed with Mr. Edmeston in thinking that the principal reason of its failure in roofs in this country was to the adulteration to which the metal had been subjected in the process of manufacture. For this reason it was most desirable that the sheets should be legibly stamped with the name of the maker.

Mr. Ashpitel thought that if zinc would stand at Liége, which was the Birmingham of Belgium, it would certainly stand in London. There could be no doubt that, if zinc were more generally used, architects, as they became accustomed to the metal, would be able to subject it to tests similar to those by which they ascertained the quality of lead. He had been informed that the mode of manufacturing zinc at present was very different from that formerly adopted, and that the metal was subjected to a second fusing process, in order to get rid of the presence of other metal—such as iron or lead, which were generally found in the same mine. With regard to soldering, it was quite as easy to boss out the end of a gutter in zinc as in lead, provided the zinc was of the right quality. Then with respect to expansion and contraction, it seemed to him that either were of little consequence, so long as there was room for the metal to expand or contract. A sheet of zinc might possibly contract more than a sheet of lead, but of what consequence was that? There was, however, one point connected with zinc which, it seemed to him, architects should not overlook, and that was, that the metal was susceptible of being put at a cheap rate into many pleasing and artistic forms. They were all aware of the beautiful forms to which lead might be reduced; but lead was an expensive vehicle of ornamentation; and, if zinc could be rendered into artistic forms at a cheap rate, that circumstance would make its general introduction still more desirable.

The Chairman observed that he could add an illustration, as to the permanence of zinc, to those adduced by other speakers, and which would be the earliest instance mentioned. It had been employed by his father in 1828 to cover some flats; and, although thirty-two years had since elapsed, these roofs had remained in a good state. In other cases, however, he was bound to say that his experience did not induce him to view the substance with great favour, as he had seen many failures. The subject was well worthy of attention, and the whole case had been put fully before the meeting that night: they must have felt, he thought, that the success of zinc depended upon attention to various circumstances, and that it was difficult to insure that all would be attended to. He was sorry that, owing to the lateness of the hour, incidental to the reading of two papers, the first communication had passed without full discussion, as it contained many points with regard both to construction and artistic effect which could not fail to be of interest to the architectural profession. He had jotted down half a dozen heads, but would speak only of one—concrete. Several points arose well deserving of attention. Mr. Scott had informed him that, in his experience, he had ascertained that, where certain materials were used, concrete failed. He believed that it was the intention of Mr. Scott to move for a committee on this subject, for it was most essential that they should ascertain under what circumstances it was wrong to place confidence in it. Further, in a paper read last session, Mr. Lewis had thrown some doubt on statements made by him (the chairman) in an essay on the subject as to the shrinkage of the materials used to make concrete, and he proposed, on some early opportunity, to show that his statements were correct, and that it would operate unjustly towards contractors to circulate a contrary opinion. He was sure the meeting felt much indebted to Mr. Burnell and to Mr. Edmeston for their interesting and valuable contributions, and that it would arrive at the conclusion that architects should do more than look at new materials: where really convinced of their utility they should seek to bring them into use, so as, if possible, to improve artistic effects or lessen the cost of construction.

Professor Donaldson suggested that it might be desirable to have a committee appointed to consider the subjects referred to by the chairman.

The Chairman announced that the meeting to be held that day week would be for special business only (including the election of a president in the room of the late Earl De Grey), but that on Monday, the 23rd instant, Mr. Papworth would read a paper on the "Superintendents of English Buildings in the Middle Ages," and that on the 6th of February Mr. E. M. Barry would read a paper on the "Rebuilding of the New Italian Opera House, Covent-garden."

SITTINGBOURNE CEMETERY.—Messrs. Wimble and Molyneux, of London, have been appointed to carry out the Sittingbourne Cemetery Works, according to the designs submitted by them.

'TWAS SIXTY YEARS SINCE;

OR, A REVIEW OF THE PROGRESS MADE IN THE MECHANICAL ARTS OF CONSTRUCTION SINCE 1800.*

IT has been said by philosophers and historians that advantage is to be obtained from an occasional pause in the restless advance of our civilization, and from a retrospective glance towards the starting-point of our progress. If this be true in metaphysical, or in historical, science, there seems still less reason to question the applicability of the maxim to the more decidedly physical branches of study; and in them especially it must be advantageous to dwell occasionally upon the various lessons to be derived from past experience, or to derive hope and encouragement for the future from the contemplation of the improvement already attained. At the present day there is also prevalent a disposition amongst the younger, and perhaps also amongst the more conspicuous elder members of the particular branch of the architectural profession cultivated by this Institute, to treat the study of the practical details of their profession with indifference, and to dwell almost exclusively upon the æsthetical portions of their pursuit. A review, however slight, of the great changes effected in the mechanical arts of construction within the lives of some now present, or since the year 1800, may therefore have somewhat of the charm of novelty to many: at any rate, the lessons it will afford must be fraught with instruction and interest to all, if properly handled.

The particular date to which the review is limited, I would observe, has itself been selected with a definite purpose, viz., in order to allow us to trace the influence of the great Revolution in men's minds, which marked the close of the eighteenth century, upon even the technical branches of science; for it is certain that any profound agitation of the higher faculties of the human mind must react upon every form in which human activity displays itself. Unquestionably the inhabitants of the civilized world have made greater progress, in their political and moral advancement, within the last century, than they did in any corresponding period of the world's history, notwithstanding the faults and the crimes which have disgraced in turn almost every nation; and so also, to descend from this exalted moral sphere to our own technical pursuits, do I believe that the mechanical arts have made similar progress, and that, especially since 1800, they have been developed with a degree of energy and of success of which mankind had no previous example.

Let us not, however, in starting, be ungrateful to our predecessors. The wonderful progress we have been able to make was in fact prepared by the researches of the philosophers and engineers of the earlier portions of the eighteenth century; and they who are curious in historical parallels may trace, in the feverish energy with which all classes of analytical and physical sciences were cultivated at those periods, the influence of the long peace of Europe which followed the prostration of French power in 1713; and the still more direct influence upon English prosperity which followed the conclusion of the civil wars in 1746. Such men as d'Alembert, Lahire, Borda, Bossuet, Coulomb, Bonguer, Clairant, Lacaille, Camus, Peyronnet, De Cessart, Rougemont, Lamblardie, &c., in France; as Boyle, Cavendish, Black, Desagulier, MacClaurin, Robison, Franklin, Maskelyne, Hutton, Watt, Wedgwood, Smeaton, Brindley, in England; Euler, Frisi, Brunnings. Bernouilli, Pallas, Ulloa, and countless other philosophers, mathematicians, and engineers, in Italy, Germany, and other countries, had laboured earnestly and successfully to advance the knowledge of physical and applied sciences. Works such as the bridges of Orleans, Nantes, Neuilly, Tours; the ports of Havre, Treport, Dieppe, the commencement of the great breakwater of Cherbourg, the Eddystone Lighthouse, and the completion of the Bridgewater canal; or, still more remarkably, the first steps in the application of the steam-engine; were surely sufficient to entitle the engineers of the last century to our admiration and respect. Fortunately for us we have succeeded to a rich heritage, and we have reason to be grateful to our predecessors. But the natural law seems to have held in this case, as in most others, viz., that progress has accelerated by the mere fact of its own existence: "vires acquirit eundo:" and I hope to show that the present generation of practical philosophers has done its duty in transmitting with increased brilliance the torch it received from the race which so honoured the eighteenth century.

Perhaps the most simple and logical method of treating the subject before us would be to trace the history of the improvements introduced into the separate branches of construction, *seriatim:* and, as far as possible, in their chronological order, I propose, therefore, to call your attention, first, to the improvements effected since 1800 in the execution of foundations; second, to the increased facilities for construction afforded by the introduction of new, and the more perfect study of the capabilities of old building materials; and, third, the increased facilities afforded by the use of new tools and machinery. Of course no one man can pretend to know, or be able to record, all that has been done in so wide a field; and I, therefore, at once beg you to excuse, and to supply, the defects of this cursory review.

1st. The researches of the geologists of the last century had called the attention of architects and engineers to the study of the strata upon which buildings were to be erected, and the drainage operations carried on by Elkington had led some acute observer to question the correctness of the principles upon which many eminent practitioners then founded their buildings. About the middle of the last century, in fact, Labelye and De Cessart had given a species of vogue to the method of founding in deep water upon caissons; and the same principle was adopted in executing the foundations of ordinary buildings erected upon soft compressible ground; for about that period nearly all the buildings, for instance, erected in the marsh lands near London, were founded upon timber platforms, in preference (be it observed) to the use of piles, according to the custom of the Dutch. The first great improvement made in this particular branch of construction since 1800 seems to have consisted in the use of concrete, a substance well known to the Roman and the Mediæval architects, but which had been neglected until Vicat's "Experimental Researches into the Qualities of Limes and Cements" had again turned the attention of builders to the application of that class of materials. Vicat himself seems to have been one of the first persons to use concrete, on a large scale, in the foundations of the bridge of Souillac; and, in our own country, Sir R. Smirke and the late Mr. J. Rennie may be considered to have been the revivors of the use of this material. At the present day concrete has entirely superseded all the systems of timber platforms, and in many cases it has equally replaced the use of piles; that is to say, when the area of the bearing surface is very large in comparison with the weight, and the subjacent foundations are protected against lateral displacement.

The introduction of the Parker's Roman cement, in 1796, had, to some extent, prepared the way for the use of what may be called monolithic foundation courses, such as were thus obtained by employing concrete. But the greatest advance in this branch of applied physical science was unquestionably due to Vicat, who first successfully expounded to the public, in 1818, the principles upon which the setting of lime depended. Since that period other labourers have been in the field, and not only have the qualities of the various descriptions of natural limestones been carefully studied, but the manufacture of artificial hydraulic limes and cements has assumed an extraordinary degree of commercial importance. Sir C. Pasley, Mr. St. Leger, Frost, Hamelin, Aspdin, Blashfield, and at a later period, Messrs. Minard, Kuhlmann, White, and Francis, have in turn increased our resources of this description; and with such success have their labours been attended, that at the present day the artificial hydraulic limes and the Portland cement have to a great extent superseded the use of the natural material of those descriptions. Amongst the most remarkable instances of the application of the Portland cement may be cited the foundations of the Westminster-bridge, the hearting of the Dover jetties, and the huge artificial blocks laid upon the sea-slope of the Cherbourg breakwater, to protect the small rubble of the central parts of that wonderful work. The principle upon which the use of concrete in foundations is based, viz., that of supplying a solid homogeneous mass, to receive the superincumbent weight, has, it may here be added, lately been applied in a still more striking manner; for the French engineers have actually constructed some bridges (such as the Petit Pont, the Pont aux Doubles, both of which have arches of about 104 feet span, and the Pont d'Alma, the centre arch of which is 141 feet span, with a rise of 1-5th) of small rubble, bedded in rapidly setting cements, upon the avowed theory that these arches would practically become huge monoliths. They trusted, in fact, to the adhesive powers of the cement, just as Mr. Brunel did in the construction of the Maidenhead-bridge; and they have succeeded, as he did, in accomplishing their object. The execution of the new graving-dock of Toulon, entirely of ordinary concrete, poured into sea-water at least 26 feet deep, may also be referred to as an illustration of the boldness and skill of our neighbours in the use of this material, as well as of the great service it is susceptible of rendering, when it may be desirable to found structures in deep water. Unfortunately the study of the properties of the various kinds of lime is not a favourite one in England, and it is, no doubt, to this peculiarity of our ordinary professional education that we may attribute the comparatively limited use made in this country of concrete as a material of general construction, and its exclusive employment in foundation works. Perhaps the explanation of the preference for cement, for hydraulic limes, so common amongst our constructors, may be found in the same neglect of this important material.

The substitution of cast-iron piles and plates for timber piles and sheeting, of which instances may be observed in the wharf wall of the Blackwall railway station, of the Adelaide-wharf, and of the Chelsea and Westminster bridges, may be cited as illustrations of the application of that material to foundation purposes, at least in an indirect manner. But the greatest modifications lately introduced in this detail of construction were, firstly, those by the French engineers subsequently to 1816, in the manner of founding their bridges (by the use of close sheeting, the interior of which was then dredged out and filled in with concrete), instead of the old and expensive method of forming coffer dams—a method now almost universally exploded on the Continent, though, unfortunately, some of the leading English engineers did not scruple to attack Mr. Page, with great personal bitterness, for introducing it in the new Westminster-bridge. Secondly, we may quote the application of Mitchell's screw piles, and the introduction of the Naysmith and of other descriptions of steam pile-driving machinery. Thirdly, we may quote the introduction of Dr. Pott's system of driving hollow cylinders of metal, for the purpose of forming as it were permanent masonry piles under the basement courses of a bridge. Fourthly, the idea, upon which Coulomb, in the last century, based a system for executing foundations under water, has been considerably modified and extended in the course of the execution of the new Rochester, Saltash, and the Strasbourg and Kiel bridges. In these cases, large hollow cylinders were sunk through the moveable or compressible upper strata to the solid subjacent rock, by the application of machinery for the compression of the air in the cylinders themselves. Descriptions of these very remarkable works may be found in "Les Annales des Ponts et Chaussées," for May and June, 1859; in "Les Nouvelles Annales de Construction," November, 1858; in the "Dictionary of Technical Terms" of the Architectural Publication Society; and in a pamphlet by Mr. Hughes, which, unfortunately, was not published, upon the foundations of Rochester Bridge. This pamphlet was, it may be observed, of the greater value from the fact that Mr. Hughes conducted that remarkably successful operation. A fifth modification of the method of founding buildings upon compressible subsoils may perhaps, be here mentioned: it consists in the use of a layer, of more or less thickness, of fine sand, which is prevented from spreading laterally and extends over the whole bearing surface of the building. In fact, practically, sharp silicious sand is incompressible; for, as its particles have usually as little cohesion as the molecules of a fluid, a weight brought upon one portion of the surface becomes distributed over the whole, if simply the weight be prevented from piercing the surface, and if the sand be prevented from moving laterally. This method of founding has been adopted in the execution of some heavy embankments carried over peat mosses, and I have myself applied it in the erection of some extensive cotton warehouses on the soft alluvial soil lands near Havre.

2nd. About the end of the last century cast-iron began to be used for building purposes, and the execution of the Coalbrook Dale and of the Sunderland bridges, the former of which was completed in 1777 from the designs of Thomas Pritchard and Abraham Derby, and the latter from those of Thomas Payne in 1796. But the general application of this material appears to date from the period when Telford employed it in the construction of the Chirk and Pontycastle aqueducts, the first stone of the latter of which was laid 25th July, 1795, and of the former 17th June, 1796. Telford also, in 1796, commenced the construction of Buildwas Bridge with an arch of 130 feet span; and subse-

* Read by Mr. G. R. Burnell, at the Institute of Architects, as elsewhere mentioned.

quently the practical and theoretical investigations carried on in our own country into the properties of this material by such engineers as Telford, Rennie, Rastrick, Brunel, Stephenson, and by such physicians as Tredgold, Barlow, Navier, and lastly by Willis, Mosely, Morin, and Hodgkinson, have admitted its application in the most varied manners and on the largest scale, in the forms of girders, voussoirs, pipes of enormous size, railings, and ornamental decorations. The improvements in the science of metallurgy have, indeed, contributed to bring cast-iron into almost universal use; but it is necessary here to remark that the introduction of the hot blast in the smelting of iron, about 1831, and the method of converting the cinder-iron, introduced by Messrs. Hill & Co. of Merthyr, has so materially deteriorated the qualities of mercantile cast-iron, that considerable discretion must be exercised by the architect and the engineer in the application of the ordinary formulæ given for its use.

The building arts have benefited by the improvements in metallurgy in other ways than in the cheapening of cast-iron. Thus, for instance, the facilities afforded by these improvements for the manufacture of rolled plate and angle iron, under the influence of the constantly increasing exigencies of the public, forced architects and engineers to adopt, about 1846, the plate-iron system of girders, with which the names of Stephenson, Fairbairn, Hodgkinson, and Clark will always be connected as inventors and appliers. Wrought-iron is now also used largely in bridge construction, in the shape of chain and wire suspensions, or in the form of lattice girders, or even as girders avowedly designed to resist principally efforts of compression; and, more latterly still, the introduction of Bessemer's system of preparing steel seems likely to modify to some extent the methods of girder and chain structure at present received; for, if the powers of resistance of the steel so made should prove to be tolerably uniform, its greater elasticity will, in many instances, lead to its substitution for the cheaper but less elastic and, consequently, bulkier wrought-iron.

Again, the diminished cost, since the commencement of this century, of some of the other metals, has increased the number of materials at the command of the architect and engineer, for both constructive and ornamental purposes. The preparation and extraction of zinc, copper, and tin, for example, have all been diminished in cost of late years; and consequently the manufacture of their alloys has followed the same direction. The applications of platinum, aluminium, and iridium, are as yet too few, and too costly, for ordinary building purposes; but the alloys of aluminium seem likely, in fine machinery works, to supplant the use of gun-metal entirely. The new methods of preparing lead for mercantile purposes, in the form of rolled sheet and drawn pipes, or even in the form of pipes made by hydraulic pressure, and the introduction of the various methods for galvanizing iron, both cast and wrought, have equally increased the resources of the builder since the commencement of the present century. Even as late as 1840, we may add, much cast lead was employed: at the present day none but the rolled lead is used.

It may not be out of place here to dwell for a short time upon the reciprocal influence which the arts of locomotion, and of construction, have exercised upon one another. The execution of the great network of canals, now very unfairly neglected, led to the discovery of expeditious modes of forming earthen embankments, to the rapid execution of tunnels, and to the application of cast iron to building purposes. Simultaneously with the establishment of this canal system, the wonderful system of our turnpike and parish roads was being developed;—at the same period, be it observed, that the first Imperial Government of France was carrying on the works of the Simplon, Mont Cenis, and Riviera routes. In the course of the execution of the English roads, Telford displayed the originality of his genius, by the introduction of the suspension principle in bridge building, at Menai, Conway, &c., and thus solved the great difficulty of spanning wide openings at a small expense; whilst the execution of the Southwark Bridge, by Mr. John Rennie, proved the extraordinary capabilities of cast iron, as applied to arches. But it was the railway system which gave the great impulse to the arts of construction, by the compulsory introduction of wrought iron as the material to be employed in the execution of girder-bridges. It may be that some devoted admirers of the architectural styles of peculiar epochs may regret the facilities afforded for carrying out trabeated construction, by the discovery of the laws of resistance of wrought-iron girders, in the course of the experiments required before attempting the construction of the tubes for the Menai and Conway Bridges. There are, however, I believe, few practical architects who do not feel, and who do not willingly acknowledge the debt of gratitude they owe to the illustrious men who have so immeasurably extended the resources of their art.

The introduction of new building materials has not been limited to the metals alone; for since the peace of 1815 especially the world has been ransacked to supply our markets. Marbles are brought from the French Pyrennees, Belgium, Italy, Spain, Greece, and Russia; whilst, oddly enough, we as perseveringly neglect the resources our own country affords, as in the cases of the marbles found near Plymouth, in Derbyshire, and in the isle of Anglesea, and in Ireland. The Caen, Aubigny, and Maltese stones, have been used here sometimes on a large scale, and with tolerable success, when proper precautions have been taken; but the more resisting tertiary limestones of the Paris basin, strange to say, have never been introduced. At home, our stone-merchants have been more active, for, since 1800, the great market of London and the west of England has been supplied with numerous varieties of stone previously unknown to our masons. The oolitic series has furnished us the Barnac, Kettering, and Bath stones, to which new railway facilities will soon probably add the Upway and Tisbury varieties of the Portland stone. The magnesian limestone series has supplied the Anston stone, the value of which (in our London atmosphere at least) seems to be more than equivocal. The sandstones from Yorkshire, the millstone grits of Bramley Fall, and the various stones from Craigleith, Arbroath, Dundee, &c.; the slates of Bangor, the flagstones of Caithness, Rockhill, Yorkshire, Arbroath, &c., have all likewise been recently added to our resources, and, judiciously employed, they might immeasurably increase the facilities for the execution of polychromic decoration. The recent introduction of the white Suffolk brick, and of the variously-coloured marl and kiln-burnt bricks, has naturally acted in the same manner as the introduction of the variously-coloured stones above mentioned; or of the asphalte, the use of which, on a large scale, only dates from 1837.

The same activity has been displayed in the timber trade, and the number of woods at our command has greatly augmented since the peace of 1815 especially. Fiscal arrangements have, however, somewhat interfered with the natural course of the timber trade; for until a very recent period there was a differential duty in favour of our colonial produce, which tended to keep foreign woods from our market. Since the excessive favour thus shown has been withdrawn, a great change has come over our timber trade. There is now not the slightest advantage in the use of Canadian or American baulks; and none but the superior descriptions of red and yellow pine deals are likely to be sold here. Nearly all the fir timber used in England now comes from the north of Europe, and (as is universally known), it is of a superior quality to that of the timber formerly brought from America; though unquestionably the new woods, such as hackmatac, cedar, green heart, imported from that continent, should be exempted from the implicit condemnation contained in this observation. For the two first-named of these woods have great power of resistance to the effects of alternate dryness and moisture; the latter, the green heart, is said to resist the attacks of the teredo navalis, and of other boring worms. Perhaps these newly introduced woods are more especially adapted to engineering purposes than to those more correctly named as architectural; but the Italian and Russian oak, the African and Moulmein teak, the bird's-eye maple, and satin wood, and the newly imported Vancouver's Island timber, have placed at our disposal extraordinary facilities for the execution of beautiful architectural details in this class of materials. I would beg to dwell awhile upon the consideration of the last-mentioned wood, not only on account of the great advantages it offers in the execution of constructive details from the enormous length,* and scantling, it presents, which render it invaluable for roofing purposes, but also on account of the beauty and the cleanness of its grain. I have employed it myself for some elaborately panelled wainscoting; and I distinctly state that I never saw any fir timber fit to be compared with it. The workmen who may use this wood will, it may be added, find that it requires that the tools should be kept remarkably sharp, but no other extra precaution need be taken in working it.

It would not be just to dismiss, with a merely incidental notice, the wonderful improvements lately made in the ornamental ceramic and vitreous arts. The extenive use of stoneware in the manufacture of pipes for house-sewers, water-closets, &c., of glazed earthenware for tiles, sinks, and numerous other domestic purposes, and of encaustic tiles, Palissy ware, China and Parian wares, have, for instance, enabled architects to attain new and brilliant effects. Messrs. Minton, Copeland, Davenport, and their colleagues, have indeed nobly carried forward the art so brilliantly inaugurated in the last century by Wedgwood, but perhaps the most decided revolution effected of late years in the details of the arts of construction, is the one which has taken place in the glass manufactures, in consequence of the abolition of the excise duties about twenty years since. The glass formerly used in England was both small in dimension and bad in quality, whereas at the present day the quality and dimensions of mercantile glass are such as to enable the architect to execute any description of ornamental work he may possibly require, so far, at least, as those materials are concerned. It is to be hoped that our Government may profit by the lesson thus taught them, and that they may relieve the manufacturers of paper-hangings from the difficulties thrown in their way by the excise upon paper. Perhaps I may be allowed here to digress a little into the region of political economy, and to observe that it is not to be expected that an improvement in the manufacture of paper-hangings would immediately follow upon the abolition of the paper duty. It requires some time before the conditions of a manufacture can adapt themselves to new fiscal arrangements; and, as in the case of the repeal of the excise on glass, it was some years before our manufacturers derived the full benefit of the measure; and as in the case of the repeal of the excise on bricks, little change has yet been effected; so in the case of paper-hangings, it may be some years before our manufacturers may recover their ancient position in competition with the manufacturers of other countries.

The science of applied chemistry has, since 1800, rendered service to the arts of construction in other cases than those connected with the manufacture of artificial cements, or with the improvements in metallurgy and the ceramic arts. Thus, the introduction of the oxide of zinc, or the sulphate of baryta, as a substitute for the oxide of lead, as the base of oil colours; the great improvements lately effected by the able chemists of France and Bavaria, under the guidance of such artists as Ingrès and Cornelius, in the painting on glass; the processes of Kuhlmann and Ransome for the preservation of building stone, by the application of soluble silicates; and the processes of Kyan, Margery, Bethell, and others, for the preservation of timber, by the use of salts of mercury, or copper, or of creosote; and the discovery and application of the electrotype process by Spencer, may be cited amongst the more apparent benefits conferred of late years upon our pursuit by chemistry. I do not dwell upon the technical improvements in the moulding of horn furniture, in the applications of caoutchouc, gutta percha, leather, or of the textile fabrics; nor do I dwell upon the wonderful change which has been effected of late years in the mode of procuring and of distributing artificial light, because these various manufactures are of a character sufficiently distinct to require separate notice. But it must be evident that every one of these improvements in manufactures has acted markedly upon the style and character of many details of the architectural decoration of our house interiors especially; at the same time that it has enabled us to attain effects which it would, previously to the commencement of this century, have been absurd even to have attempted. The increased number of the mineral and vegetable oils, and of varnishes and pigments, lately placed at our service, have likewise exercised a distinct influence upon ornamental decoration.

The third branch of the subject before us, viz., the review of the improvements effected in the arts of construction by the use of new tools and machinery, ought, properly speaking, to be divided into two sections, one of which would be devoted to the consideration of the tools used in the manufacture of other tools; and the second, to the consideration of the machinery actually employed in building operations. It would, however, occupy too much of our time were we to dwell upon the principles, or the details, of wheel and screw cutting, of turning, punching, slotting, and boring engines, important though they be in the history of art; and I propose only to call your attention to the new machinery which comes immediately under the notice of the architect and building engineer. The number of these machines is daily increasing; for the continued rise in the rate of wages, the scarcity of labour produced by the extraordinary emigration of late years, and the consequent almost inevitable restlessness and indocility of the labouring class, have driven the employers of skilled labour to seek to substitute mechanical for manual labour, wherever it has been possible so to do. As the architect formerly was expected to know something at least of the names and uses of the tools employed in the various building trades, so now he must understand the general action of the machinery by means of which his designs are carried into effect, and which are employed in the works he is expected to value.

In carpentry machinery is little used, unless it be for the purposes of driving piles, or of hoisting and transporting wood. Some years ago, I had the honour to call your attention to the former class of engines; and at present I would simply add, that at the beginning of the present century the old ringing pile-engine was the only one in use. This was replaced gradually by the heavy monkey, worked by the crab; and, subsequently to 1844, by the steam pile-driver, by Naysmith's hammer, and by Dr. Pott's system of pneumatic pressure. For the purposes of hoisting and transporting timber, the first great improvements made since the commencement of this century, were those introduced by the late Mr. J. Rennie, in the mahogany-sheds of the West-India Docks, which have in fact served as the types for all the more modern travelling-cranes. Mr. Telford introduced some ingenious modifications of both the pit and the double crane, in his various canal and dock works; and in some of the more important ship-building establishments, the derrick has been latterly applied for the purpose of hoisting long, cumbrous timbers. In ordinary architectural practice, however, a "guy poll" and a crab are nearly all the hoisting machinery required for handling carpenters' work, just as they were "sixty years since."

Since 1830 the application of machinery to the various descriptions of joiner's work has, however, taken place on a much more extensive scale. The circular saw, and the block machinery, established by Sir Mark Brunel at Portsmouth, was the first step in this direction; and it was followed by the general introduction of the frame or pit saw, and of the circular and the veneering saws now so common. More latterly still, the ploughing, grooving, tenon-cutting, planing, moulding, fillistering, and even carving machinery has been introduced; whilst the system of artificial desication has been rendered available for building purposes—with what success it would yet be hard to say. Machinery has likewise been applied to the sawing, working, and polishing of marbles, slates, and stones of a uniform quality; to the making of mortar, the tempering of clays for brick and pipe making, the moulding of such bricks and pipes, the grinding of limes and cements, the rolling of metals into various forms, the hoisting of building materials to great heights (as exemplified in the new Houses of Parliament, and in the very remarkable structures around the new Basins at Marseilles), the execution of earthworks in formations of a tolerably uniform character, and to the execution of Artesian borings of great depth. The motive power adopted for the above descriptions of machinery has varied in accordance with the necessities and the capabilities of the situations where they have been applied; and wind, water, and steam have been pressed into our service. In England, however, the tendency is decidedly to use steam on nearly all occasions, in preference to the apparently cheaper, but more uncertain, natural agents. Hydraulic power has, however, latterly been employed with remarkable success in many cases; such, for instance, as the hoisting of the gigantic tubes of the Menai and Saltash Bridge, in launching the *Great Eastern*, &c.; and the facility with which the ordinary unloading operations of the Docks are carried on by means of hydraulic machinery, would induce us to believe that it might equally be applied in building operations, when large quantities of work are to be performed in a small space and in a brief period. In the construction of many of the railway viaducts lately erected, steam machinery has been used for hoisting the materials; but I am not aware that hydraulic machinery has hitherto been so applied.

In one of the branches of an architect's duties (which modern practice seems likely to withdraw from the members of that profession, in order to confide them to the newly-established class of civil engineer), but which formerly was considered to be, as I have called it, a "branch of the *architect's* duties, viz., the construction of bridges, two minor mechanical improvements may be alluded to as having been introduced since 1840, in addition to those previously mentioned. The first of these is the application of boring machinery to the formation of the passages for the tying-down chains of suspension bridges; to the preparation of the holes for receiving the tubes, subsequently filled in with concrete, intended to replace piles under the body of the structure; and, under any circumstances, to ascertaining the nature of the subsoil of the intended position of the bridge. The second of these improvements is the one connected with the lowering of the centres of an arch, an operation of the greatest importance in that branch of construction, for if the centres should be removed abruptly, or with a jar, the solidity of the vault they support may be dangerously affected. There have been several notices in the "Annales des Ponts et Chaussées," especially since 1848, on this subject, to which I beg to refer my hearers. At present it may suffice to say that the system which has been most prominently brought forward is the one in which the centres are made to bear on bags filled with dry sand. The escape of the sand is regulated in such a manner as to be under instantaneous control, and the centres are thus eased without shock or jar of any description.

In ordinary building operations very little improvement has been, or could be made upon the implements formerly used. The shapes of shovels, spades, tools, navvies' barrows, dobbin carts, earth waggons, timber and stone whims, spring carts, with straight or cranked axles, carpenters', smiths', or masons' tools, have all, no doubt, been greatly modified to meet the continual demands for rapidity of execution; but it would hardly enter into our province to notice them. Neither would it be worth our while to dwell upon the improvements in, or the applications of, the ordinary Bramah's press, or of the screw-jack; and we can only in passing allude to the ingenious devices adopted by our Transatlantic brethren for transporting, bodily, the buildings they wish to preserve, and to the cumbrous machinery employed by M. Lebas to raise the Obelisque de Luxor, at Paris, in 1837. Strictly speaking, also, attention ought to be called to the wonderful changes which have been superinduced in our modern domestic arrangements by the universal application of the water-closet system, by the improvements in the details of water-supply, by the improved methods of heating, light-

* Some sticks of this timber are not less than 127 feet long, by 36 inches square, at one-third of the length.

ing, and ventilation; and even by the use of speaking-tubes, and in some cases of the Electric Telegraph. But the mere enumeration of these adaptations of physical science to the ordinary wants of life, is sufficient to show the range of the investigation before us, and the utter impossibility of including the whole of it in one lecture. It may suffice, therefore, at present to say, that the tendency of all that is going on around us is to increase the number of the material elements of comfort at our disposal, if only by reason of the facilities they afford for improving the sanitary state of our homes. At the same time, however, all the improvements in the arts of building, tend equally to increase the powers of the architect of the present day to produce effects in the æsthetical branch of his pursuit, which were physically beyond the reach of his predecessors, devoid as they were of the wonderful facilities offered by the new materials, the new processes, and the new machinery which have been introduced subsequently to "sixty years since." The power of obtaining and handling stones, and beams of gigantic dimensions, of spanning great openings by the use of small materials connected by new mechanical processes, or by new cements, and of erecting important structures in positions wherein formerly it would have been impossible to attempt any permanent work, have given rise to a spirit of boldness and hardiness of mechanical daring which must eventually react upon the artistic expression of our age. An attempt was made, in the erection of the Crystal Palace, to eliminate a style of architecture which should be characteristic of the state of the mechanical arts of the day; and in the Menai tubular bridge a structure has been raised, whose simplicity and grandeur of effect approach as near to the character of sublimity as can be conceived. Neither of these structures was, however, faultless as a work of art,—the Crystal Palaces, both old and new, being, in my opinion, as ugly as they could well have been;—but the signal has been given, the path in which we ought to march has been indicated; and if we boldly look forward, instead of backward,—if we strive to create an architecture of the future, instead of contenting ourselves with an architecture entirely based upon a reproduction of the past, the progress made in the mechanical arts of late years will not remain much longer so sterile as it has been for architecture. One of the first lessons to be learnt by the artists who would seek to make to themselves an abiding reputation by their application of the means and appliances lately placed at their disposal seems to me to be, that the laws affecting the resistances of the materials themselves require that they should be treated in many cases so very differently from the older materials that it is absurd to attempt to adhere to archæological correctness of detail, or, in other words, to endeavour strictly to apply the principles of ornamentation of styles of art which prevailed in other times. I allude especially to the miserable attempts to be seen in our own country and abroad to execute Gothic or Grecian designs, such as bridges, colonnades, &c., in cast iron; because the feeling of logical impropriety must be excited when we look at the pointed arches and the meagre chamfering of what it is the custom to call a Gothic cast-iron bridge, and the intercolumniations of the so-styled Grecian colonnades must always offend an educated eye. In fact, just as the use of the Grecian marbles, and of the Roman bricks, led those nations respectively to modify the forms of art they had received from other nations, so ought the use of the cast and wrought iron, of the glass and cement of our day, to lead us by degrees to eliminate a style which should be characteristic of our generation.

It seems, indeed, to me, that the moral to be derived from our cursory review of the improvements made since 1800 in the mechanical arts of construction, is precisely that it behoves us all, engineers and architects, to seek to discover the true spirit in which those improvements should be applied. The materials, machinery, and principles of practical execution lately introduced, regarded as elements of art, ought, I think, to be used with reference to the physical and mathematical laws affecting them, rather than with reference to their powers of adaptation to any particular style of architecture, in new buildings especially. There should be no attempt to produce, by the aid of cast and wrought iron, for instance, sham Gothic tracery, with all the joints of the stone ribs elaborately reproduced by marks on the face, such as I have seen in some instances abroad. Cements should not be used with scorings, in order to look like stone; nor should cast-iron columns be painted to look like marble. Each material should be used in the position for which it it best adapted; and should "tell its own tale," honestly and without disguise, in a way to satisfy the judgment of even those who have not the time to seek the hidden explanation of the objects directly before them. Possibly the earnest attempt to bring about this result may cause the quarrels of *Classicists* and *Mediævalists* to fall into comparative insignificance; but candidly, would that be a misfortune? Why need we be always "au char de la raison attelé par derrière?" Must we always be compelled to seek in the practice of the past a justification for the designs we may make, and the system of construction we may adopt, when the whole tendency of our civilization, and the spirit of the age, would lead us to strike out a path of our own, distinct in its character from those of former times, though of course based upon the æsthetical principles which the experience of ages has confirmed? In the charming opera, "La Dame Blanche," founded on two or three of Sir W. Scott's romances, one of the characters repeats as a reason for doing some old-fashioned act, "Car c'est ainsi que cela se pratiquent en" —"Ecosse il y a soixante ans." We, it is true, are little disposed now to seek models from amongst those who practised "sixty years since;" and they themselves could boast of little originality of invention. The architects, engineers, and mechanicians of, and subsequent to, that period have, however, endowed us with means and appliances which, rightly used, would enable us to leave "our foot-prints on the sands of time," if only we dare to think and reason for ourselves. May we not, therefore, consider that the course we ought to follow should be to strive after the attainment of a style which should be characterized by its mass and simplicity of outline, its boldness and its truth, its strength and sublimity in structures, which may be susceptible of that quality; and that we should, in short, adopt Montagne's sentiment, and seek *nous tenir au massif et au vraisemblable*. The effect of the various improvements in the mechanical arts seems to tend, as it were, to efface detail, the excess of which is the defect of most scholastic art of the present day; and at any rate they would give scope to any magnitude of conception the architect, or engineer, might be inclined to indulge. From what has been done at the Britannia-bridge, the joint railway-station at Birmingham, the reading-room of the British Museum, and the Crumlin viaduct, we may learn that more remains to do, before we can flatter ourselves that we have turned to its full artistic use *the progress made in mechanical arts of construction since* 1800. We must, in fact, learn to be truly ourselves, before we can fairly consider that we have reaped all the benefit of the changes made of late years upon the mechanical arts which prevailed "'TWAS SIXTY YEARS SINCE."

THE EXTENT AND POPULATION OF THE CHIEF METROPOLITAN DISTRICTS.

THE following notes show the extent of some of the great parishes, and the number of their inhabitants:—

The extent of Marylebone is 1,509 statute acres; population, according to the census of 1851, 157,696; probable population at the present time, 190,000.

The area of St. Pancras is 2,716 statute acres; population, according to census of 1851, 166,956; present population about 200,000.

St. Mary's, Islington, contains an area of 3,127 acres; this, it will be noticed, is more than twice as much as that of Marylebone, and very much more than the area of St. Pancras, considered an "enormous" parish; the population was, however, not more than 100,000 in 1851.

The City of London Union comprises ninety-eight parishes within the walls, and the area only 434 statute acres, and yet the population in 1851 was 55,932.

West London Union,—area only 136 statute acres, with a population of 28,790.

East London,—area, 136 statute acres; population, 44,401.

St. Martin's-in-the-Fields,—area, 305 acres; population, 26,640.

St. James's, Westminster,—area, 164 acres; population, 36,406.

St. Margaret's and St. John's, Westminster,—area, 917 statute acres; population, 65,609.

Strand Union,—area, 174 acres; population, upwards of 44,000.

St. Giles's and St. George's, Bloomsbury,—area, 245 acres; population, 54,214.

St. Matthew's, Bethnal-green,—area, 760 acres; population, 90,193.

St. Mary Abbots, Kensington,—area, 7,374 statute acres; population, 120,000.

St. James's, Clerkenwell,—area, 380 acres; population, 64,778.

Holborn Union,—area, 196 acres; population, 46,621.

Stepney Union,—this district has been subdivided, but in 1851 it contained a population of 110,775, with an area of 1,257 acres.

Whitechapel Union,—area, 406 acres; population, 79,759.

St. Mary's, Lambeth, contains the large area of 4,015 acres, and a population, 139,325.

St. Mary's, Newington,—area, 624 acres; population, 64,816.

St. George the Martyr, Southwark,—area, 282 acres; population, 51,824.

St. Giles's, Camberwell,—area, 4,342 acres; population, 54,667.

St. Mary Magdalen's, Bermondsey,—area, 688 acres; population, 48,128.

St. Saviour's Union, Southwark,—acres, 250; population, 35,731.

St. Olave's Union, Southwark,—area, 169 acres; population, 19,375.

St. Mary's, Rotherhithe,—area, 886 acres; population, 17,805.

Greenwich Union,—area, 5,367 acres; population, 99,365.

Wandsworth and Clapham Union,—area, 11,605 acres; population, 50,764.

St. Luke's, Middlesex, Old-street,—area, 220 acres; population, 54,055.

St. Luke's, Chelsea,—area, 865 acres; population, 56,538.

St. George's-in-the-East,—area, 243 acres; population, 48,376.

St. Leonard's, Shoreditch,—area, 646 acres; population, 109,257.

Mile-end Old Town,—area, 681 acres; population, 65,500. This hamlet, prior to Lady-day, 1857, formed part of the Stepney Union. It is now separated.

Hackney Union,—area, 3,920 acres; population, 58,429.

St. John's, Hampstead,—area, 2,252 acres; population, 11,982.

Brentford Union,—area, 20,546 acres; population, 45,000.

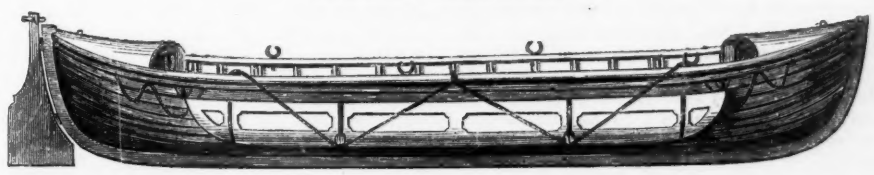
We will put a few of these figures in more clear contrast, for the purpose of showing the vast difference which there is between the area and the populations of the large metropolitan districts:—

	Acres.	Population
Brentford Union	20,546	45,000
Wandsworth and Clapham Union	11,605	50,764
St. Mary Abbots, Kensington	7,374	120,000
St. Pancras (present population)	2,716	200,000
St. Marylebone	1,509	157,696
St. George's-in-the-East	243	48,376
St. Leonard's, Shoreditch	646	109,257

The density of the population of some of these districts is remarkable when compared with that of others.

In St. Leonard's, Shoreditch, 109,257 people are placed on 646 acres of ground. In the poor and overcrowded parts the poor-rates and other local taxes are enormous, and form as great a contrast as do the population and extent. These figures, together with other facts, show the necessity for the revision of the metropolitan district with a view to the equalization of the local taxation.

LUDLUM'S LIFE-BOAT.



WE are asked to assist in making known this invention. In Nature the bird has its wings upon its sides, and the fish its fins *hinged* for action as circumstances require. In like manner, says the inventor, the floats of Ludlum's life-boat are made adjustible, so that either or both may be fastened, by ropes or chains, close under the sides of the boat, be extended horizontal with it, or be turned upwards quite against or above the gunwales. Men within, it is maintained, are shielded from shot, seas are not liable to break into it, and the two great defects of life-boats are remedied, viz., liability to capsize, and want of self-righting power, in the same boat.

The floats are of a conical or egg form, in their transverse section, and constructed of cork, or of tin (more or less), canisters of zinc, gutta percha, or, for gun-boats, of galvanized iron, covered with wood. They are of such shape as to be well protected by the gunwales, and, with their attachments, may be varied to suit the different style of boats to which they are applied.

Should the boat be placed bottom upwards, by a self-acting spring bolt she folds her "fins" or floats, from an extended position, close under her sides, rights herself, and immediately extends them as before.

The boat, when constructed as a *self-righting* and *relieving* one, is made upon the general principles of such boats, with a sufficiency of shear from stem to stern, with high bulkheads, and with an inner deck with valves opening to the bottom of the boat.

These valves are balanced into place by a level turning upon a pivot, and are opened downwards by pressure of water from above.

The high bulkheads are made of service by placing in their bottoms water-tanks, opening through faucets into the boat, and filling through tubes from above.

Into the bulkheads above the tanks are inserted valvular air-tight doors, thus creating lockers for the stowage of provisions, &c.

The inventor maintains that a boat thus "winged" or finned would long sail a shipwrecked crew upon the open seas, and would never swamp or capsize.

THE LOUVRE AND THE TUILERIES.

HENRY II., to whom we owe the termination of the old Louvre, erected in honour of Diana of Poictiers the château of Anet, wonder of the Renaissance, 1552. Charles V. spread education, founded libraries, encouraged art and literature. He repaired and much increased the building of the Louvre from 1564 to 1568: he undertook, also, the château of Saint Germain-en-Laye, in 1570 (coeval with the building of Winchester Cathedral by William of Wykeham).

Catherine de Medicis erected the château of

* Continued from p 11, *ante*.

Saint Maur-sur-Marne, and commenced the gallery of the Louvre, of which the first stone was placed by Charles IV., 1568; continued by Henry III.; taken up again by Henry IV., upon plans by Androuet Ducerceau: to this prince, 1590-1611, we owe the châteaux of Presles and of Montceaux, in Brie; the embellishments of Saint-Germain and Fontainebleau; the completion of the Pont-Neuf, commenced under Henry III.; the Palais Royal; the Briare Canal; the restoration of the cathedral of Orleans. He bought, also, the Hotel-de-Ville,* that curious attempt of revolution in the art; and he gave a new face to the capital by the care which he took in repairing and embellishing it; and invited a number of *savans* and artists, who received many proofs of his liberality. He is not thought or spoken of by the French but with love. Under Henry IV. and Louis XIII., the light and gracious, but very often empirical, style of the Renaissance was gradually lost and became disused, and the classic adopted, but sometimes spoiled by bad treatment; and often showed how the best things become bad by their excess, and become so in proportion to their excellence.

Philibert Delorme and Jean Bullant, celebrated architects, were charged to furnish the plans of the Tuileries by Catherine de Medicis. They presented the design of a building much more vast than is that of to-day, but this project was not entirely executed. They first raised the great pavilion, placed in the centre of the façade. This pavilion was crowned by a vast dome, circular, and covered with slates. Afterwards they changed the form of this dome, which now has a quadrangular form—a form much more suitable—this large central pavilion, the two lateral buildings, and the pavilions which were erected at their extremities, then composed, and composed for a long time, the château of the Tuileries. The different parts of this edifice were and are still covered with a roof in slates of a great height, as it may be seen above the greater part of the edifices of Paris built in the sixteenth and seventeenth centuries. These enormous roofs, which do not accord with the classic orders to which they are made to associate, owe their origin evidently to the roofs of feudal fortresses, and the latter owed them to thatched houses. Both here and in the court of the Tuileries then there existed features, such as open galleries and arcades, which are not presented in the now existing façade, but which are composed of three regular stages of windows (*croisées*). In 1572, Catherine de Medicis occupied it, but soon deserted it. The reason seems to be unknown why, after having built the château of the Tuileries, and having employed upon it considerable sums, the talents of the most celebrated artists, and all the results and the delights of luxury, she should abandon it in so little a time after the edifice was completed.†

Chambray, in his "Parallèle d'Architecture Ancienne avec la Moderne," gives two examples of the Ionic orders of each of those celebrated architects, Delorme and Bullant. He shows that the profile of Bullant is precisely according to Vitruvius: the former, he says, ought not to be imitated, not being conformable either to antiquity or to Vitruvius, or even to common sense; and not having any regularity in the parts of its composition; that there are many mouldings placed without any motive, most of them little and poor, where the frieze is larger than the cornice, and where, in the base, the general proper disposition of mouldings is reversed, where the great size of the torus is excessive, above the smaller scotiæ below. The caryatides, first perhaps introduced upon the degeneration of the Ionic order, in which women are represented, whose delicacy does not correspond to the weight of the burthen with which they are charged, gave rise to all sorts of extravagancies.

Chambray deserves attention, and has authority. He was, says Errard, almost the first who, by his works, made known to France that greatness of manner which gives to the principal members of every order few parts, but great and of a bold relief, so that the eye seeing nothing little, the imagination may be more touched with it.

There are some artists of original stamp who look upon rules and precepts, in short, any prescription for art, only as fetters to them. Such they probably are to those who have no mind of their own. It is well known that Delorme was inventive and skilled in the principles and science of construction, and was, in producing fine designs for sepulchral monuments for kings, as in the chapels of St. Denis, not by any means deficient. He did many excellent things without the assistance of imitation, and was exempt from that impeachment, which has always been cast upon the French nation, of loving and adopting the productions of foreign countries to a mania. Delorme contrived, on his own approved system, in most confined and difficult situations, plans for staircases; and his roofs have been adopted more than once, since the sixteenth century, and by living architects in Paris, in more than one edifice: as an instance, we refer to that of the corn market (*halle au blé.*)*

The palace of Luxembourg, under Louis XIII., was built by Jacques de Brosses, from whom we have the front of St. Gervais. There are numerous imitations of it in Paris, and which were erected during the great revolution, called the renaissance, that took place in the fifteenth and sixteenth centuries. Quatremère says, of De Brosses, that nothing particular is known of his person or of his life: we are ignorant even of the place and the date of his birth, and of his death. However, he has acquired fame by the front of this church, and by the palace of Luxembourg. The front of St. Gervais far surpasses that of St. Paul St. Louis, built in 1634, after the designs and superintendence of Derrand, a Jesuit; but that, however, is considered as one of the most curious and most interesting specimens for the study of the style of this epoch. The style of Luxembourg palace is somewhat borrowed from that seen so often in the palaces of Florence, and in the Pitti palace, to which many persons have thought it bears a striking analogy. The Luxembourg, built at great expense by Marie de Medicis, who had no want of it, and lived in it but a very short time, ought to bear her name; but this queen having left it to Gaston de France, duke of Orleans, her second son, he wished to name it Palais d'Orléans, by which name it went until the epoch of the revolution.† The alliance of the house of Medici with that of France made more easily known to the Tuscans the affairs of France, and their influence was felt, for the first years of the ministry of Colbert, upon the politics, the government, the language, and manners of the French. The private relations of epistolary correspondence increased and animated it.‡

In the *procès-verbal* which was drawn up in 1636 upon the streets of Paris, we might see what was then its deplorable state; streets not yet paved, or which were not paved but on one side, or only in some parts. We need not enter into detail, but the obstruction, the absence of light, the badly-built houses, the long accumulation of dirt, were very active sources of corruption and of contagious diseases for the inhabitants in the quarter of the Louvre. Paris then, says Dulaure, much resembled a poor but proud man, wearing gilded garments upon linen dirty and full of vermin.§

Before the reign of Louis XIV., when the arts wanted patrons, French architects, perceiving that the occasions for building were rare in France, and that, notwithstanding the nobility of their art, they could with difficulty distinguish themselves from artizans, preferred rather to take another part than to follow a profession in which they could not satisfy the passion that they had for glory. This coldness and this indifference for architecture lasted some time, and did not much reassume its former character till under the glorious dominion of Louis XIV., by whose order monuments arose which presented to the people of his time and to posterity the brilliant evidences of taste which this great prince had for the arts. He showed on more than one occasion that he knew how to join to the capacity of choosing able architects and artists, a generous inclination to reward their merit: he exerted and supported the emulation of artists by the foundation of the academies of France and Italy, where not only the experienced artists could confer together, but where the pupils had the facility of instructing themselves under professors of distinguished merit, in such a manner that it is by the institution of these illustrious schools that the French architects show that the genius of the nation yields not to that of other people, and that they could succeed in anything that they undertook when they were excited by the protection of so great a monarch. It is, in short, through this emulation that we have seen so many beautiful edifices;* whose examination contributes no less to improve and perfect the arts of our days, than the works of the Greeks once served to instruct the arts of Italy. We may say, too, that it is edifices of all kinds which attract to our capital the most distant nations, to draw from them the science of architecture, as well as other arts. Nothing has, perhaps, served so much the greatness of Louis XIV. as the superb buildings which he has erected.—(Blondel's (Jacques François) "Architecture Françoise," 4 vols. folio).

The façade of the Louvre was commenced, among other beautiful edifices, in 1663. In 1664 Colbert charged Levau to terminate and repair the palace of the Tuileries. This architect made many changes in it. The staircase, of matchless construction, but much out of place, was taken down and placed more conveniently. The centre pavilion was removed: they decorated it with two orders, the one Corinthian, and the other composite; and an attic with caryatides. Colbert resolved to distinguish his administration by finishing the Louvre, and wished to carry to perfection what he found imperfect. Not content with what Levau had done, nor either with his project of continuing it, he invited artists to compete. The decoration of the front elevation by Levau, which was throughout in pilasters, was much censured: it was judged as wanting nobility, dignity, a mark of royal distinction, and as having too little relief: his door was unanimously found little, and of too small importance to serve as entrance to such a monument. The king himself found fault with it. Among the projects which were exhibited, together with that of Levau, was one by Claude Perrault. It was designed with much taste and propriety, and was universally admired. Charles Perrault, brother of Claude, thus writes of this competition in his "Memoirs," &c.:—"Whatever knowledge Colbert had of the capacity of my brother, Claude, in architecture, I perceived that he hesitated to execute his design; and that it seemed strange to prefer the conceptions of a medical man, in a matter of architecture, to the designs of the most celebrated architects. The envy of the professors and masters of art in Paris was not wanting in railing against the resolution, and the making bad jokes, saying, that architecture must be very ill that it had need to be put in the hands of doctors. Levau, who presented the first design, and Lebrun, the king's painter (who was not ignorant of the principles of architecture), could not approve of the design of Claude Perrault (which was preferred to Levau's), always saying that it was only beautiful in painting, and that assuredly they would find it bad in execution, on account of the too great depth of peristyle, which was 12 feet, and that the architraves made all look low; but such precaution was taken, that nothing in the world is more solid, nor is there anything either so bold or so beautiful in all the works of antiquity. At the invitation of Colbert, Bernini came from Rome, although he was working at St. Peter's. He admired the hand of Perrault in the colonnade of the Louvre, and remarked of it, that if Paris contained such a gem, and such a rare genius, why should he be called away from Italy?" Colbert, the Mæcenas of all the arts, formed an Academy of Architecture in 1674. Voltaire† remarks upon this: "It is little to have Vitruviuses without Augustuses to employ them." The principal front of the Louvre, commenced in 1666 from the designs of C. Perrault, was terminated in 1670. This façade was 525 feet in length; in height 85 feet. It underwent changes, and was embellished under the reign of Napoleon I.

The wars that France had waged seemed, and were when they had ceased, favourable to the arts. It was the ambition of many kings,—whose battles were executions of justice, and the glory of whose deeds have rendered them so illustrious, after they had won battles, were loaded with spoils, had subdued their enemies, and had brought peace to the hearts and homes of their subjects,—to turn their attention to such enjoyments as accompany the possession of the arts and the culture of the sciences. The Louvre, commenced by François I.,

* Victor Calliat, in his "Encyclopédie d'Architecture" (Paris, 1851), says that the Church of St. Eustache and the Hôtel-de-Ville, are the two most remarkable monuments erected in Paris in the time of François I.

† Dulaure, "Histoire de Paris."

* Unfortunately it does not exist now. Legrand and Molinos, architects, introduced it, and it caused a general admiration, but which was of short duration. Consisting of wood, it took fire in 1802, by the imprudence of a plumber, and in two hours nothing remained of that immense work of carpentry. For description, or plates of it, see V. Calliart's "Encyclopédie," and Kraft's "L'art de Construction."

† Dulaure, "Histoire de Paris."

‡ "Dictionnaire des Dates."

§ *Trottoirs*, recommended by Patte and Girard, architects, were not laid down till 1769 to 1791. In 1783, the *maximum* height of houses, fronts, and the *minimum* of streets, was determined and enforced under Louis XVI.

* And numbers unbuilt, in folios, published by Government, namely,—"Les Grands Prix d'Architecture," successful designs of competition by French aspirants.

† "Siècle de Louis XIV."

and continued through a long line of kings, was, after war, the main object of their ambition, and they resolved to enrich, to enlarge, or to complete it. More than one inscription on a plate of gold has been placed by royal hands in the foundations of the Louvre, and has risen, Phœnix-like, when the swords have been sheathed and victory proclaimed. This ancient ceremony of laying the stone has always been an important event in the history of the Louvre, which is the history of France. The effect of the recent and final ceremony, under the auspices of Napoleon III., on the occasion of the finishing of this palace, and its union with that of the Tuileries, was long felt and talked of after that memorable day in Paris, the 25th of July, 1852, had witnessed it. On that day of triumph for art, of gratification for the public, and of reward to the workmen who had distinguished themselves on it, M. Casabianca, Secretary of State, laid the first stone of this superb edifice. Visconti was the architect-in-chief.

It is still astonishing the position that France and her capital occupy in Europe as a great centre and school of art, when she has been so incessantly distracted by wars, and when, if we read the history of France, and the wars during the French monarchy, from the time of H. Capet, we shall find that they form the most considerable and the most distinguished portion of her annals. Yet we see, in the happy times of peace, that she can become, by the fine arts, and by favouring the exercise of them, not less than by war, most prominent among the nations of the earth. They were to her both her ornament and her strength. Arrived at a higher point of excellence than preceding ages had been able to carry them, they were felt and seen to be the most wonderful things that could emanate from human hands. Those who excelled in them were sure of public esteem, and their productions were the means of bringing them before great men and great powers. The most powerful of kings chose the arts as the objects of their special patronage, and they were viewed by discerning observers with as much curiosity, as much emotion, as the war despatches in turbulent times had been devoured by a crowd of listening enthusiasts. The great work which was being erected, and which had long absorbed the energies and the ambition of many crowned heads, and many very accomplished architects, was the Louvre, which, as taste existed more pure and more diffused, on account of the number and variety of beautiful buildings which could be examined and compared one with the other, it had become a lever to raise the arts nearer to perfection than heretofore, and to benefit the country and trader to a greater extent. If we contrast it in its present finished state with what it was under the reign of François I., we shall be astonished at the great and material change that has taken place in it,—a change which had been in course of gradual and increasing accomplishment for many centuries. This noble and venerable residence of kings, increased and approached to its long-anticipated and much-dreamed-of completion, from age to age. It took many efforts, and many epochs. Slow and tardy in its growth, like other vast and difficult works, it required the result of civilization, the application of great experience and great influence, to develop and complete it. The failures or the prejudices that occurred from time to time to check its progress, the frequent alterations that were made, and the many difficulties that had to be overcome, only show that, after all, men are often but the creatures of their time, and can only do that which is practicable in the condition of society in which they live. There were some great and gifted men who co-operated upon it at one and another period, and who possessed all the professional experience then known, but whose manner was meaner and inferior to those who followed them and stood on vantage ground. Time—that silent and unceasing worker of the destinies of men and their projects—it was indebted to this Time. The Louvre, before it was seen in its present finished aspect, united with its royal neighbour the Tuileries, was not as if each successive portion of the pile prepared by the first course of operations facilitated the next, but it was deemed necessary in one age often to pull down and build in a new style that which had been built in a former age. However, we now behold it worthy in its completion, the fact of which gives an idea of a multitude of difficulties brought to a level; worthy in its varied and magnificent designs of the refined men who conceived and spent their lives upon it; worthy of the noble race of kings who commanded its execution and spared no pains or expense to witness its realization. Many things render it one of the most interesting royal residences of Europe — a palace which tempts foreigners from all parts of the world, and which is a model and a lasting resource of design to students.

F. LUSH.

FACTS RELATING TO THE USE OF ZINC ABROAD.

THE reputation of zinc for roofing is not good in England. Abroad the material appears to be used very largely and successfully. To ascertain the reason for this difference the Vieille Montagne Zinc Mining Company have recently commissioned Mr. James Edmeston to inquire into the matter. His report, which was read at the Institute on Monday evening last, and is about to be published, is now before us. The Vieille Montagne Company is a very extensive undertaking :—

"In the seven large smelting establishments in Belgium and Prussia, comprising 230 furnaces, 29,000 tons of spelter are produced, and 23,000 tons of sheet zinc are annually made, besides about 7,000 tons rolled at mills which are not the property of the company. In the three establishments for making oxide of zinc, about 6,000 tons of oxide are annually manufactured. The company is besides a large purchaser of spelter in the market.

It is said that the general consumption of spelter throughout the world is about 67,000 tons per annum, of which about 45,000 tons are made to take the shape of rolled sheets, and these are estimated to be applied as follows, each quantity being somewhat below the truth :—

	Tons.
Roofing and architectural purposes	23,000
Ship sheathing	3,500
Lining packing-cases, ...	2,500
Domestic utensils	12,000
Stamped ornaments	1,500
Miscellaneous	1,500
	44,000

Fifteen years ago the quantity used for roofing did not exceed 5,000 tons : none was employed for ship sheathing or lining packing-cases, and the stamped ornaments in zinc date only from 1852."

The process of manufacture is simple : the calamine (carbonate of zinc) is first calcined, by which it loses about 20 per cent. of its quantity : it is then ground in a mill, and mixed, to the extent of one-third of its bulk with powdered coal, to assist the smelting. The whole being much moistened, this mixture is put into the smelting-pots, and these at six o'clock every morning are placed in the furnaces. At six o'clock in the evening, that is, in twelve hours, the smelting is complete. The metal is drawn out and run into metal moulds : it then goes into the rolling-house, and is again melted and recast in a metal mould to produce ingots of the proper size and weight for the required gauge of sheets to be rolled : this second melting is also desirable to obtain proper purity.

In the first place, purity in the metal to be used for building purposes is important : if there be much impurity no after-care will be of any avail. For ship sheathing—and zinc is now very largely used for this—perfect purity is essential, for it becomes immersed in a down-right galvanic bath; and if iron be present in even a small quantity, or lead, it would quickly destroy itself. This is not so much the case in roofs, but purity is most desirable; and impurity may exist to an extent sufficient to spoil the best-constructed roofs, and in many cases has done so beyond doubt.

Mr. Edmeston made inquiries in England previously to going abroad, and all the replies were condemnatory, with two exceptions.

"Some instances of failure were brought before me, and these were mostly as follows :—

Crumbling to pieces; black spots appearing, supposed to be the effect of London atmosphere; holes and wearing out of the metal in a short time;—all these would arise from impurity in the metal, or from contact with iron. Then,

Cracking in places; soldered joints parting; drips or joints failing in flats; tendency to buckle and to have an untidy appearance in consequence, and general unsoundness of the work;—all these would arise from bad construction."

Abroad, amongst the failures, he mentions one :—

"But, even if the zinc contains no iron, the contact of iron, where a little confined damp may exist, will be quite as injurious. I cannot find that this is understood here : iron nails are commonly used for boarding under the zinc, andif a nail head is in contact, and there is damp, in three months a hole will be eaten through. Generally speaking, for the best roofs on the Continent, zinc nails are used for the boarding, and all iron work, where necessary, and if used at all, is galvanized. Or where iron nails are used for boarding they have small heads, and are hammered well into the wood so as to be buried, and a little cement or stopping is frequently rubbed in over them. Practice has found that the nails thus used rarely do any mischief, and as the zinc nails require certain care and take more time, and are dearer than the iron, I found that in Paris, at all events, the iron were used frequently, but always with the above precautions.

I could not discover that the contact of lead was injurious, but it is considered to be better avoided.

Impure zinc being brittle will crack when turned up against the rolls, or it will break off entirely, and the builder, who saves something in first cost, is quite likely to lose more in the end from waste.

The second set of defects to which I have alluded, and other modifications of them, will be referable to ignorant construction : they none of them exist where proper knowledge has been exercised in this respect, and the one object to be kept in view is to permit *perfect freedom to the sheets*, to confine them no where, and to separate lengths of guttering, and any other portions of a roof requiring to be made in long pieces, as much as possible."

"Eaves gutters should be made in short lengths, bent in the direction of the way in which the sheet has been rolled, and soldered; the solder put between the sheets and one sheet lapping over the other : they must not of course be screwed to the rafter's feet—a practice, by the way, which occasions a constant failure in the joints of iron eaves gutters. Wherever a down pipe comes there should be a stopped end in the gutter, and the gutter should never be continued longer than possible in one piece : where it is laid behind a parapet, as in all the new and magnificent buildings in Paris, a separate piece of flashing will disconnect it wholly from the sheeting on the roof. For guttering, the gauge used should be increased in proportion to length, say No. 14 for 10 feet, No. 15 for 20 feet, and so on up to No. 18. There should be a proper substance in all cases. No. 14 is ample for London; in Germany it is customary to use a less thickness.

The choir of the cathedral at Cologne is covered with Silesian zinc. The old lead was defective and was removed, and the zinc substituted by Herr Zwirner, in 1829. The gutters are zinc : it is laid in the old way without wooden rolls or fillets, as is the custom still in Germany. Herr Zwirner, the architect to the Royal Commission, informs me 'that zinc is now commonly used for roofs in the whole of Germany,' and that all his practice has taught him 'the solidness and closeness of a well-constructed zinc roof.'

Oak boarding will spoil the zinc, and the fir should be dry; the boards laid with an aperture of about half an inch between each : if they are damp, as much oxidation will take place on the underside of the zinc as on the top of it.

A good way of laying flats in some situations is without rolls, but with sunk gutters between the sheets, with, in fact, inverted rolls, which form gutters : for London, however, I would recommend the ordinary way, as the small gutters are liable to be filled with blacks and soot if neglected. In forming laps care must be taken to prevent the water from ascending, by capillary attraction : there must either be space enough to prevent the drops thus rising, or the end of one sheet must touch altogether, and that of the other be kept well away; and this is found the best mode, and the least open to careless treatment by workmen.

The thicker the zinc the less its expansion and contraction. And I find as follows, in a report made to the Academy of Sciences, by the director of the Conservatoire des Arts et Métiers, a government institution existing in the Rue St. Martin, to inquire into scientific inventions, civil engineering, and all constructive science :—

'It appears from actual experiment that the oxidation proceeds for about four years, gradually diminishing after the first three months, and that it then hardens into a protecting coat ("émail") of a dark grey colour, preserving the metal beneath from any further deterioration.' And it concludes by saying, 'that it becomes evident that as a sheet of zinc exposed to the atmosphere for a series of years loses little or nothing of its weight or thickness, and as its surface remains hard and polished, like enamel, it may be fairly deduced that the following years are not likely to occasion any alteration, and therefore that zinc will be placed in the same condition as bronze, which is protected by its "pattine" for ages.'"

Amongst new works in Paris, Mr. Edmeston mentions—

"The new markets, constructed of iron, under the direction of M. Baltard, architect, in 1856. These great roofs are covered wholly with zinc, No. 14 gauge, the gutters being No. 16, the whole in perfect condition, except in one place, where some undulation has occurred in consequence of the workmen having confined the metal by solder very needlessly, because a little extra labour was necessary to lay the zinc properly : the down-pipes are of zinc No. 14.

Also the entire roofs of the magnificent houses forming the Boulevard de Sebastopol, the new mansions in the Champs Elysées, the new part of the Louvre, in which the flats are of zinc and the curbs only of slate; the roof of the Hôtel de Ville; the roof of the Church of St. Clothilde; and, in fact, nearly every roof formed in Paris within the last fifteen years.

He mentions,—

"That while cement does no injury to the zinc, the lime of Paris destroys it, and that when cisterns or other zinc constructions are confined with brickwork, in mortar, the custom is to fill in round them with earth so as to protect the zinc from the lime."

A report of a committee, appointed by the Central Society of Architects in Paris, recommends,—

"That zinc, which was at first rejected, but is now so generally used, should be applied with great care, as certain precautions, very simple, but never to be overlooked, are indispensable : thus contact with plaster, which contains a destructive salt, is to be avoided; also contact with iron, which is very injurious, and liable to cause a rapid oxidation : eaves gutters should always be supported by galvanized brackets, and no gutter or sheet zinc should be laid on oak boards."

Mr. Edmeston deduces from these facts and independent inquiries, that it is impossible longer to contend—

"That zinc is other than a valuable and excellent material for building purposes, too important to be overlooked, and worthy of a more extended use and of a better appreciation than it has yet received with us."

DURHAM CATHEDRAL. — The works at the central tower, recently illustrated in our pages, are under the superintendence of Messrs. Walton & Robson.

PROPOSED CAMBRIDGE GUILDHALL.—THE ASSEMBLY-ROOM.

PROPOSED GUILDHALL, CAMBRIDGE.

IN our present number we give a view of the design for the Cambridge Guildhall, by Messrs. Peck and Stephens, of Maidstone, to which the first premium was awarded; and also a view of the interior of the Assembly-room, as proposed. In our last volume* will be found our notices of the drawings at Cambridge, amongst which the present design appeared under the motto "Utility." We refer our readers to the second of the notices, for particulars of this design, as well as to the extract from the report of the professional referee, which we gave subsequently.†

THE CENTENARY OF HOGARTH.

PROPOSAL TO EXHIBIT THE ARTIST'S WORKS IN THE FOUNDLING HOSPITAL.

ON the 26th of October, 1864, this, in many respects, the most eminent amongst those painters who may be considered as the founders of the English school, will have been dead one hundred years. Since that date his works have increased in money value to a wonderful extent, and his fame has spread not only throughout his own land, but also in many foreign countries.

It is both curious and satisfactory to trace the onward progress of English art since the days of Hogarth, and it should not be forgotten that to him even more than to the exertions of Sir James Thornhill and others, we are indebted for the establishment of the Royal Academy, and for public exhibitions of pictures.

The exhibition of the works of Hogarth, Hayman, and other of his friends, was made in the apartments of the Foundling Hospital, as we noted recently; and so great was the attraction, that crowds thronged to the place.

It has been suggested that the centenary of William Hogarth should not be passed over without celebration, and that nothing would be so suitable as the exhibition of as many of his works as could be collected together; not only the paintings, but sketches and fine impressions of the engravings which were executed by the artist's hands. A collection of this kind, which would enable us to glance at once at the results of Hogarth's useful and laborious life, would not only have great interest, but would also be the means of enabling many to form a juster estimate of the high position which this artist is entitled to hold. It has been thought that no place would be so suitable as the apartments of the Foundling, in which Hogarth was so frequently a visitor when in life.

* Pages 773, 789. † Page 843, in last volume.

THE ARCHITECTURAL MUSEUM.

ON Wednesday evening last, Sir Walter James delivered the first of the new course of lectures in the theatre of the Museum at Brompton, and was attentively listened to by a good audience. His subject was "The Norman Architecture of Canterbury Cathedral," and he illustrated it with a large number of drawings and plans. First describing a Roman basilica, he mentioned the resemblance to it in early Romanesque churches, and afterwards showed, following the theories of Hope and Whewell, how Pointed architecture had grown out of Romanesque.

Mr. G. G. Scott, in moving a vote of thanks to the lecturer, commented on the advantages resulting from the devotion of time and thought to such subjects by men in the position of Sir Walter James. It would be of no use art-workmen improving themselves, if the public were not also informed and ready to employ them.

Mr. Joseph Clarke announced that the next lecture of the series would be delivered by Mr. Godwin. It would be addressed especially to art workmen and those who might be striving against difficulties.

Cards of admission may be obtained at our office.

THE PROPOSED DRAINAGE OF RIO.

THE following relates to the proposal about to be introduced for the drainage of the city of Rio. It also appears that the guarantee is in the form of a rate (in Brazilian currency) on each house, analogous to that granted to a gas company some years back. There is no city in the world in which drainage is more needed than Rio:—

"29, Threadneedle-street, London, Jan. 7.

SIR,—Referring to the notice in your impression of to-day of the intention of bringing before the public, at an early date, the proposal for draining the city of Rio de Janeiro, and to the effect which it has had upon the Brazilian Railway shares, it is, perhaps, desirable that you should be informed that, although the aggregate of the capital required will be 650,000*l.*, the sum to be paid for the first six months will be under 100,000*l.*, and for the second six months only 65,000*l.*, so that it manifestly would not affect the existing Brazilian securities.

To this we may add that a portion of the capital is already subscribed, and a list of applicants for the remainder is filling privately: thus the amount that will be offered to the public will be limited.

HILL, FAWCETT, & HILL, Brokers to the Company."

Our advertisement columns give further particulars of this important and promising undertaking. The concession is for ninety years. The plans have been prepared by Mr. Gotto. The Brazilian Government is bound, by legislative enactment, to pay to the Company 42 milreis per annum, which, at the par of exchange of 27d., amounts to 4*l.* 14s. 6d. for every house now erected or hereafter built within the three districts during the term of concession, such payment to be made half-yearly for all the houses, whether occupied or not. The number of houses, according to the last returns, amounted in June, 1859, to 13,739; and adding the average number of houses yearly built in the city, there will be, on the completion of the works (within the three districts) at least 14,891 houses (the number provided for in the contract) from which the revenue of the company will arise. The amount to be received upon 14,891 houses will alone produce a gross income to the company of 70,360*l.*

Professor Donaldson is one of the directors.

CAMBRIDGE GUILDHALL: THE SELECTED DESIGN.—MESSRS. PECK & STEPHENS, ARCHITECTS.

BUILDING STONES USED IN MANCHESTER.

AT the last ordinary meeting of the Manchester Philosophical Society, December 27th, Mr. Wm. Fairbairn, president, in the chair, Mr. Binney read a short communication, entitled "A few Remarks on the Building Stones used in Manchester."

A stranger visiting Manchester, on having his attention directed to the modern buildings in it, will doubtless notice the substantial nature of the bricks of which they are built. Of the stone employed for building, he will most probably be of opinion that it is not of the most enduring character for the climate and atmosphere it is subject to, and the unfair usage by which architects and builders think proper to test it. For, however, well it may be established in theory, that a sedimentary stone in a building ought to lie in the same position as that in which it was originally deposited in the earth, unfortunately in practice architects will persist in attempting to make the stone accommodate itself to their designs of buildings, rather than design their buildings in accordance with the nature of the stones they have to employ. No doubt beds of stone of great thickness and uniform composition are difficult to find, especially in sedimentary rocks, but still that is scarcely an excuse to place it on its end or at right angles to the planes in which it was deposited.

Of late years a considerable number of experiments have been made as to the strength of building stones, just after they have been taken from the quarry, by pressure. This, no doubt, will give an idea of their power of resisting force at the time of the experiment being made, but it will give little evidence of the strength of a building stone after some years of exposure to a climate and atmosphere similar to those which the building stones of Manchester are exposed to, without the stone is of a pure silica, or nearly so. In all stones which are subject to chemical decomposition, these experiments will not surely guide us.

Old buildings in country places, remote from the smoke and gases of large towns, are often adduced in evidence of the strength and durability of a stone to be employed in a manufacturing town. However well the dolomite of Bolsover-moor might endure the climate and atmosphere of Southwell, in Notts, as it is seen in the Minster there; or the triassic sandstone of Furness might endure, in the abbey of that name, each seven or eight centuries; still, it would be unreasonable to expect that either of these stones could resist the action of the moist climate of Manchester, and the atmosphere of a city in which about forty thousand tons of sulphur are annually burnt in the coal consumed in it, to say nothing of the gases given off by the numerous chemical manufactories, and the exhalations from half a million of human beings.

On examining the buildings of Manchester, we find that the stone employed is chiefly from the middle and lower coal measures: the only instances of triassic or new red sandstones having been used are, as I have been informed, the Portico and St. Peter's Church, from the Oughtrington quarry, near Lymm, and the beautiful church lately built by Mr. Crowther, at Moss-side, which is from Hollington, near Ashbourn.

The cathedral was built from the sandstones of Smedley and Collyhurst, two rocks belonging to the upper part of the middle coal-field. These stones are both soft, and contain a large amount of clay and peroxide of iron. As you proceed further down into the middle coal-field, you find the sandstones containing less iron in a state of peroxide and considerably smaller proportions of clay; still the stones are not suitable for outside work, as they contain protoxide of iron and sometimes sulphuret of iron, which are scarcely to be seen in the white sandstone when first obtained from the quarry; but, on exposure to the atmosphere, the iron becomes further oxidized, and the stone "bleeds" and becomes discoloured, as well as decomposed. It may be safely concluded that there is no quantity of good building stone, suitable for outside building in a city like Manchester, to be procured from the middle coal-field.

The lower coal-field and the millstone grit yield the only good building stones for Manchester. These strata comprise the beds lying under the Arley or Royley seam of coal and the limestone shale; and, from their being generally found on the high land of the district, are known by the name of "High Moor Stone."

As all the lower coal-field and millstone grit beds have most probably been formed of the *débris* of granite or granitoid rocks, we find in them the proportions of silica, alumina, potash, iron, lime, and magnesia, generally met with in these rocks. As a general rule, the more pure silica the rock is composed of, the better building stone it is. A mixture of mica or clay causes the rock to be more schistose or flaggy, as well as softer. Two chief beds of flags, besides several smaller ones, occur in this division; namely, the upper flag of Upholland, Catlow, and Holy Fold, lying between the Arley and Royley coals, and the lower flag or Bradshaw and Shawforth, near Rochdale, lying under the rough rock and above the upper millstone grit. These flag beds yield the stone generally used for par point work.

A fine, sharp grained, silicious grit is found sometimes above the gannister coal, as at Ending Common, near Rochdale, which makes a good building stone.

A stone much used in building is the Halliwell, Woodhead-hill, or Lomax-wood rock, lying immediately under the salts or best coal of New Mills.

The rough rock, generally known as Summit and High Moor stone (the upper millstone of the geological survey), a stone much used in building, is of a coarser grain than the stones previously mentioned. It is composed of grains and rounded pebbles of translucent quartz cemented together with partly decomposed felspar and a little iron and manganese in the state of oxide. It is soft when first quarried, and works pretty freely, hardening when exposed to the air. As a building stone it is preferred, owing to its working much easier than the two millstones. Parbold, Horwich, Holcome-hill, Blackstone-edge, and Werneth Low, are good examples of the stone.

The upper millstone of Holcome, Bank-lane, Todmorden, Saddleworth, and Tintwistle, is a hard and durable sandstone, composed chiefly of silica. It is much better to work than the rough rock, and stands the weather better, but it is not in great use, owing to its being difficult to work.

The lower millstone, as seen at Roecross and Rhodes-wood, Tintwistle, and the lower part of Pendle-hill, contains some excellent building stones, but they are hard to work, and therefore have not been much used; but it is, no doubt, one of the strongest and most durable stones of the series. In the lower parts of it are some beds of fine grained sandstone, freer to work than the upper beds. A most excellent bed of this description is found at Bailey, near Ribchester.

In selecting a durable building stone for a town like Manchester, the more silica it contains the better. Iron or manganese in the state of protoxide, or sulphuret of iron, as well as clay, all damage the stone. The stones composed of silica, cemented with silicates of soda, potash, lime, magnesia, or alumina, are all durable; but, when clay or salts of iron form the cement, the acids in the atmosphere have a very damaging effect on the building stones containing them.

The sandstones from the lower coal-field in the neighbourhood of Halifax and Huddersfield, and generally known by the name of Yorkshire stone, are much used in Manchester, owing to their good colour and free working qualities. Many of our buildings in which these stones have been used show symptoms of decay, especially in the places where long pieces of stone have been required, and in mouldings and ornamental work.

In some cases the sulphuric acid in the atmosphere has acted on the clay in these stones, and an impure sulphate of alumina having been formed, it is washed by rain out of the stone, and the grains of silica in the latter soon crumble away.

In other instances the water percolates down through the beds of the stone placed on its end until it reaches their bases, and then the frost in winter and the heat in summer expand the water, and thus force off laminæ of stone, in addition to supplying acids to act on the stone as above-named.

The under ledges of coping stones, although the stone of which they are formed is placed in its proper bedding, often exhibit evidence of decay. This seems to arise from the moisture percolating the stone and finding its way to the lower parts, which, owing to their being shaded from the sun, are nearly always wet, and thus prepared for the action of frost and heat previously alluded to.

It is surprising to find so small a variety of building stones having been used in Manchester as those above noticed, and it is to be desired that the architects and builders of our city should try other descriptions of stone when they can be had at a moderate price. It is difficult to say how the dolomitic limestones of the Permian group in Yorkshire, like those of Anston, would endure our climate and atmosphere; but so far as my experience goes no instances of them are to be found in our buildings. By the facilities which railways now afford, one might have expected that some of the beautiful syenite of Shap containing large crystals of felspar, or the grey syenite of Bootle and Ravenglass, would have made their appearance in Manchester; but, to my knowledge, none of them have been used. It is possible that they may not be known to our architects, but most probably the reason why the soft freestones of the coal measures are in such general use is that they are cheap and easily worked. My own impression is, that cheapness is more looked at, both by architects and owners of buildings, in selecting stone, than durability of character.

Some years since a good collection of the building stones of Lancashire was got together and placed in the Museum of the Geological Society of Manchester, where they are open to public inspection without charge. This might be increased with stones from the adjoining counties; and then, if the architects and builders of Manchester would associate together and devote a little time to the subject, we might expect to find a greater variety of building stones, and building stones of greater durability, than are at present to be met with in Manchester. In conclusion, the author of these hasty remarks begs to state that it would give him much pleasure to afford such an association all the assistance in his power to discover the most suitable building stone for Manchester.

THE ARCHITECTURAL ASSOCIATION.

ARCHITECTURE AND SCULPTURE.

THE ordinary meeting of members was held on Friday, 6th inst., at the house in Conduit-street; Mr. Roger Smith, vice-president, in the chair.

The minutes of the last meeting having been read and confirmed,

Mr. Hughes, of 8, Dane's-inn, and Mr. Clever, of Dalston, were, on ballot, admitted members of the Association.

Mr. Randall Druce then read the following paper, entitled, "On the Advantage that a Practical Knowledge of Sculpture would be to all Members of the Profession, and the important Means to that End that the formation of a Class of Wood-carving at the Architectural Association might become."

The Lecturer said:—Mr. Chairman and Gentlemen,—When Orgagna was carrying out the tabernacle in the church Or San Micheli, at Florence, as the designer and superintending architect of the work, "he employed various masters in sculpture, selected from various countries, to do all the other parts of the work, but devoted all his attention to the figures;" and then, "having finished them all," he turned his attention to the superintendence of the putting together of the various parts executed by the various artists. "He caused the several parts to be most ingeniously and carefully put together without cement, but with fastenings of lead and copper, to the end that no spot or blemish should lessen the beauty of the polished and shining marbles."

What a perfect combination we have here of artistic skill and love of the beautiful, with business-like superintendence and practical knowledge!

Here is an architect, who has designed a beautiful whole, confident that he alone is most capable of executing the most beautiful parts; a sculptor, taking most delight in the execution of the figures; yet, "having finished them all," being equally confident that no one but himself can so well contrive the mechanical mode of joining the fabric together, and fixing these figures in their place.

Now, I think that all of you will agree with me that as far as this is practicable, this is a desirable position for the architect or designer of a building or any other work which depends on the accumulated skill of many,—the only way indeed in which an architectural work can bear the stamp of the master or be the successful realization of his thoughts and intentions in anything like the same manner as a picture or a statue is, that is the entire work of one man.

Now my intention this evening is to endeavour to investigate how this is attainable. You will probably at first think, and would immediately reply to what I have told you above, that Orgagna was an exception—a great man,—and that an inferior man would have become only a Jack-of-all-trades, not attaining even mediocrity in each of the three callings he followed, much less be able to execute the most difficult parts of the practical work of either of them: and to a certain extent

you are right: only the Orgagnas would take up Orgagna's position, but the least endowed would surely be at least more competent superintendents of the artists employed for being, even in the very slightest degree, practical artists themselves.

Nor do I think that the attainment of this power of practical superintendence (and I think that you will allow that this of Orgagna's, although largely concerned in the art-part of the work in question, was practical superintendence even independently of the mechanical contrivance) is so difficult as may be imagined, for much of the knowledge of effect, and the best mode of producing it, that would take years of study of the works of art and writings of the best authorities upon art to attain, practical work with the chisel or brush will teach you in a few hours: the secret of the difference between the two systems—that in practice in Orgagna's time, and that in practice in our own—lies in this;—that then everything was learnt practically,—now theoretically; then the first step in an architect's education was to apprentice him to a goldsmith or some other practical branch of art,—now, to set him to draw the different by-gone styles in Chambers or Pugin.

Many a difficult point in construction was easily understood and modelled by the hand early trained in modelling the chalice he was to work in gold, which now appears incomprehensible, and consequently becomes distasteful to the artist-mind when presented to him in the unattractive shape of a line diagram; and thus the artistic and practical ornament and construction, now so often antagonistic, were learnt at the same time, and went hand-in-hand, because the knowledge sought for and attained in both was practical. And we have seen incidentally that this knowledge was often begun in the goldsmith's shop: so that we may, I think, fairly argue that the key to the more or less complete attainment of the practical power of design, execution, and masterly superintendence possessed by Orgagna, is the acquirement of the power of manual dexterity in some one practical branch of art-manufacture. Let us, therefore, before entering on the practical application of these principles to the matter in my title, take a few instances of the first entry into professional life of a few eminent artists of Mediæval times.

Arnolpho, who designed Santa Maria del Fiore, and the Or San Michele, at Florence, began by learning painting of his father, and then studied the art of design under Cimabue, for the purpose of employing it in sculpture.

Nicola Pisano, who designed the church of San Antonia, at Padua, first worked under Greek sculptors, and then perfected himself as a sculptor, by the study and practical imitation of Classical remains at Pisa.

Giovanni Pisano, who designed the Campo Santo, at Pisa, learnt sculpture from his father.

Giotto, we know, began by painting, but was also a sculptor.

Agostino and Agnolo, both architects, began by studying sculpture under Giovanni Pisano.

Andrea Pisano began by studying and practising sculpture.

Orgagna first learnt his father's calling of a goldsmith, and then studied sculpture under Andrea Pisano.

Brunelleschi, the great architect of the dome of Santa Maria del Fiore, was first placed with a goldsmith, and, as we know, beat Donatello, the sculptor, according to his own acknowledgment, in the design and execution of a wooden crucifix.

Michelozzi, the architect, first studied sculpture under Donatello.

Andrea Verocchio, who was an architect, began as a goldsmith, and was a carver in wood.

Bramanti, the architect, was first taught art as a painter.

Sansovino, the architect, studied sculpture with Andrea di Monti Sansovino, who worked principally in metal, and who had learnt his art from Bartolacio Ghiberti, a goldsmith.

Michelangelo, the great architect of St. Peter's, began his art education as a painter, but afterwards gave himself almost wholly to sculpture.

Singular it may seem to say that most of these masters were distinguished by their skill in construction when they came to employ their talents in architecture, which I am inclined to attribute to the practical nature of their art-studies, as distinguished from the theoretical nature of those studies, in the so-called art-men, in the profession at the present time. As in the studies in the practical form of goldsmith's work, painting, or sculpture, the practical way of looking at work necessary to design construction was exercised at the same time that the artist was learning art: he was also accustomed to executing work complete in itself, without the aid of others, instead of only making designs on paper for others to execute; so that, when he came to direct, he knew well what directions would be necessary to enable others to execute his designs, according to his intentions.

We see, by the above enumeration of some of the most celebrated Italian architects of the middle ages, and of their mode of education for their profession, that they all began by some practical branch of art, mostly sculpture, although often the very first steps were in the goldsmith's shop; and it appears that, when they had carried on sculpture as a profession for many years, and being as it were perfected in the production of what was then esteemed part of a building, they seem then to have had an ambition to have the entire direction and production of the grander whole; and, probably, it was also from the part that painting played as a means of adornment for buildings, that made the painter also,—when, having practised for some time an art which, with all its beauty and completeness in itself, still, like sculpture, formed but part of the whole grand composition of the building it adorned,—have a like ambition to design the building also.

We see, then, that the way that men in that day fitted themselves for designing and carrying out buildings was by perfecting themselves in some one at least of the sister arts contributing to it; and that required manual dexterity. And what was the result? That which I think might have been expected, viz., that the most ordinary details and accessories of the buildings were works of art, and equally good in their way with the statues and bas-reliefs, which, from the same cause, were first-rate, and were of great frequency, and allotted their full importance as means of architectural embellishment: sculpture and painting became architectural adornments, and architecture became the art of properly and most elegantly supporting and combining these valuable aids to its enrichment.

The architect, or the artist, when he turned his attention to architecture, was, from his early training, so thoroughly conversant with the utmost resources furnished by the sister arts, and by the practical nature of his training, so able to turn these to their best account, and so well knew whether the works he entrusted to other hands were well or ill executed, and, in his branch or branches, was so able to take the leading or most delicate parts, or to give the finishing touches, that a work was turned out as completely a perfect work of combined architecture, sculpture, and painting, as a picture or a statue is a complete work of sculpture or painting alone, and the realization of the ideal of the one sculptor or painter, and as completely a realization of the art-ideal of the artist; but the two principal best things that they learnt were an intense love of all the arts; while surely, at least an architect should, of all the men of all professions and occupations, except painters and sculptors exclusively, be the best acquainted and the most fond of those arts, and have a conviction of their unity, and how capable they were of combination, and how much they gained by that combination.

Now, there are two things that were, till quite of late years, and to a considerable extent even now are very much required to be learnt by architects of the present day. They seem, till quite lately, very much to have neglected the study of the other arts, even to the extent to which they are cultivated by amateurs engaged in other pursuits, and also to have considered their art perfect in itself, without the aid of the other two; and that the knowledge of bygone architecture alone was all that was necessary, and that principally at periods when least aided by the others, or from buildings from which the sculpture, which once gave the chief life an expression, has been broken or carried away, and on which the paintings which once shone on the walls, and which gave the chief warmth and constituted their greatest glory, have decayed and disappeared,—content with copying the bodies left by their forefathers, beautiful, no doubt, in their form and proportions, but forgetting to give them the life by sculpture, or the warm and gorgeous apparel by the sublime art of painting, which the originals had when they were first opened to the admiring gaze of the assembled multitude. Now, if a sculptor is the designer of a building, you may be sure that the last thing that he will leave out of it is the sculpture; and that as the chief delight of the sculptor is to represent the human figure, he will be sure, if possible, to find fitting places for it; and, as in studying for the accessories of his figure subjects he has to study leaves, flowers, and animals, you may be sure that he will not forget to wreath and place them in his capitals, and this not only because he can do them, but because he loves them. And if a painter designs a building, you may be sure he will not forget the colour; you may be sure that the building, when first built, will be intolerable to him,—the cold white stone an eye-sore: everything being the same colour will be unnatural and painful to him, and he will be impatient to alter its tones; to break its monotony with colour, and its dulness with storied subjects; and where the positions are not fitted for painting, he will be only too anxious to enrich his building with beautiful forms, and light and shade, by the aid of sculpture,—and that not only because he possesses the power of enriching the building by painting, but because it is his nature, increased by cultivation, to love these things.

So that I have endeavoured to show you that a genius possessed of the power of working as a painter, a sculptor, and a mechanic, like Orgagna, will be the best possible architect, *i.e.* designer and practical superintendent of a large work, or one requiring the assistance of many hands; that an ordinary man possessing as much practical knowledge of these arts as attainable under his particular circumstances, will be a much better architect, as to design and superintendence, than if he did not possess that knowledge; that the leading and most celebrated architects of the Italian school of later Gothic, and Early Renaissance, acquired their remarkable skill in designing buildings, in which the most perfect figure sculpture and imitation of nature in the details harmonized with the paintings and coloured mosaic and inlaying on the walls, combined with many remarkable instances of original and daring construction,—acquired that skill, that love of nature, and perfect and fine work, and knowledge of how work would look and combine, with the practical head and hand required to plan and make models for the execution of those daring feats of construction, in the goldsmith's shop, in the *atelier* of the sculptor, or the studio of the painter,—each having made many valuable works without the aid of any one else, and been entrusted upon their own responsibility with much valuable material, before attempting to be the sole directors of the work of hundreds, and the sole dispensers of the money of their country, in gigantic works, with many first-rate masters working under their orders.

Also, I have endeavoured to show you that the practical knowledge and power of executing works in the sister arts will give men a love for and an appreciation of them that they would not, and cannot, otherwise possess, to the manifest gain of the buildings, and also to the increased employment of artists' of those branches of art.

This knowledge and power of execution will, in fact, at once, and as a matter of course, produce the sort of feeling which made Mr. Hardwick (according to the *Times* of the other day, in an article on the new fresco in Lincoln's-inn Hall) say, that he was so pleased with it, that he should for the future leave all the spaces he could, in his buildings, for frescoes: and if those are his sentiments, may he long live and keep his promise.

Now, let us turn to the best way of applying these principles to ourselves. Most of us are past the time, and would find it difficult even if we were not, to begin our education as these men began it. Then, what is the next best way of acquiring, in proportion to our opportunities and talent, this practical knowledge of art,—this unprejudiced love of all the arts, and keen sight for and love of nature,—and this finger knowledge, that will make even an art man a good constructor, because he looks upon it in a practical manner, and does not waste all his time learning it from books, although much can be learnt from them?

With regard to the love of colour in nature, and the consequent love of the use of it in our buildings, and love and proper appreciation of the art of painting, and all that is to be learnt from a practical knowledge of painting, and a power of producing paintings, as it is not my subject to-night, I will dismiss it with the remark that the best way of obtaining them, for those that are either being educated in the usual system or engaged in the office, is painting from nature whenever they have time and opportunity, and also studying paintings in the exhibitions of the year, and not architecture only. But with regard to the love of form and light and shade in nature, and, consequently, of the expression of them by the art of sculpture in our buildings, and the love and proper appreciation of this art, and all that is to be learnt from a practical knowledge of it, and a power of producing works in sculpture, and of modelling and other means whereby we look on forms of architecture, whether artistic or constructional, from a more practical point of view, and obtain a more perfect power of superintending others in works of sculpture

and other necessary works,—this is the principal object of this paper; and, it seems to me, that as the architects of old obtained these powers by the actual practice of some one practical art, so we, in like manner, although already engaged in some other branch of the profession, may at least correct our deficiencies, and obtain some part of these powers by the occasional practice of one practical art.

I have, after some consideration, selected wood carving, as more cleanly than stone, and propose that those who think with me, or at least think that there would be no harm in their acquiring some proficiency in the use of the chisel, should form into a class, on the same principles as the class of design, and engage an experienced carver to set us going, at least in the technical knowledge and right use of the tools, and meet fortnightly for the purpose of learning to produce works of sculpture in wood.

I will conclude with an invitation to all who would like to be able properly to superintend the execution of a capital, a crocket, or a finial, in the words of Donatello to Brunelleschi, when Brunelleschi found fault with his crucifix,—"Take wood then, andtry and make one thyself."

At the conclusion,

The Chairman said that he had been much interested in the paper, which he considered contained some points deserving of their attention as architects and students of art. To these he would venture shortly to refer. The system of education among architects, seemed as if it were likely to be made the subject of change in several respects. He quite agreed with the author of the paper just read, respecting the old plan of studying nothing but drawings and engravings, without becoming familiar with the practical details of a building. Happily, however, for the student of architecture, it had become the custom to visit foreign countries, and there study the most remarkable and note-worthy buildings. To this he was disposed to attribute much of our success in Classic architecture, and the success generally which was beginning to attend the study and practice of architecture in this country. The study of foreign buildings, more especially the Classic and Antique, tended to cultivate a taste for sculpture and painting. An illustration of the development of this faculty was presented in the case of Professor Cockerell, whose pediment of St. George's Hall, Liverpool, showed the great advantage of practical artistic knowledge. As regarded the formation of the proposed class, he entirely approved of the suggestion, and hoped it would be followed up. It had, however, occurred to him that perhaps some person might incline rather to modelling in clay than carving in wood, and upon this point it might be desirable if Mr. Druce were to explain his reason for recommending the latter process. It seemed to him (the Chairman) that there was less difficulty in modelling in clay, owing to the plastic nature of the material; at the same time he was willing to admit that it did not impart the same structural knowledge which was to be derived from carving in wood. The value of knowledge superadded to architecture was notably instanced in the case of England's greatest architect, Sir Christopher Wren, who had acquired a practical knowledge of anatomy, and a European reputation for mathematics, before he commenced to practise the profession of an architect.

Mr. B. A. C. Herring suggested that if students of architecture would regard carving in wood, not as a portion of their daily office-toil, but as a recreation, it might be invested with additional attraction. He quite approved of the suggestions thrown out by Mr. Druce, because he had himself known many instances in which architects had to employ sculptors to design figures for them, whereas, if they had had themselves a knowledge of sculpture, they could have told what figures or groups would have suited their buildings best. That the sculptor's art could be readily attained by the architect was perhaps shown by the fact, that many persons who were neither architects nor professional sculptors, were, nevertheless, good sculptors. He himself had often heard of cases in which clergymen had executed fonts for their own churches, and why should not architects do the same, and design their own foliage or figures?

Mr. C. M. Lewis observed that if architects could execute their own figures, they would probably introduce sculpture more frequently into their buildings than was now the custom.

Mr. Druce said that the reason why he had suggested wood as the medium for carving, was that, in the first place, it was a cleaner process; and secondly, because, if a complete mastery of the chisel could be obtained, it would be very easy for the carver in wood to become the sculptor in stone also. It did not appear to him that a knowledge of carving was at all difficult of obtainment; and as an illustration he might mention that he knew a case in which an architect in the country, failing to obtain a skilled workman, showed an ordinary carpenter, who had never carved anything of the sort in his life, what was wanted, and, in a short time, he succeeded in producing a very creditable ornament on a weather boarding.

The Chairman called attention to the course adopted by mechanical engineers. When they got a pupil they sent him for a couple of years into the drawing-office; he next went into the workshop to file, turn, forge, and learn what a bit of iron was; and finally, he went for two or three years into the modelling-shop, where he learnt how to make in wood the models from which the machinery was subsequently cast. In like manner, it was the practice occasionally to send young architects into a builder's yard, to learn something of carpentry. If to this could be added a practical knowledge and artistic feeling in the treatment of buildings, it would be most desirable.

The Reader of the paper gave notice of his intention to move at the next meeting that a class for wood-carving be formed, and announced that, should the class be so formed, he had been promised some practical aid in the way of assistance from skilled workmen.

The next subject for the class of design will be a town-hall, and at the ensuing ordinary meeting a paper will be read by Mr. J. Johnson on "Coloured Materials, considered principally with reference to their Application to External Design."

COUNCILS OF CONCILIATION.

ON Wednesday evening, at the Marylebone Literary Institution, Mr. Blanchard Jerrold gave a popular reading, descriptive of the relations between master and man in France, and of his recent visit to the Conciliation Hall of Paris, with a view to the formation of similar institutions in England, for settling disputes between the employer and the employed. The reading did not attract an audience so large as the interest of the question would have led us to anticipate. The subject was treated in an able and amusing manner by Mr. Jerrold; and the reading, which we hope will be repeated under more favourable circumstances, was useful as showing the working of the *Conseils de Prud'-hommes* at Paris, existing under the special countenance of the present Emperor. For the decision of cases of certain kinds, and towards the cultivation of amicable relations between masters and workmen, the evidence adduced by Mr. Jerrold showed that the Councils of Prudent Men worked most successfully; but it did not throw any further light upon the question of their use in diminishing the number of strikes about *wages*, than is to be found in the evidence before Mr. Mackinnon's Committee of 1856, to which we gave attention recently. In the wages question it must be recollected the *Conseils* have no power to enforce decisions; and as it is not argued that similar bodies could have any in this country, their operation in diminishing the most fertile cause of strikes would be indirect, though probably in that way such as would well justify their institution. Mr. Jerrold showed that, in 1857, there were 50,000 disputes, of which only 8,000 proceeded from the "Bureau de Conciliation," or court of first resort, consisting of a master and a workman, to the "Bureau Général," or court of appeal, which consists of three masters, three workmen, and a president nominated by the Government; and of this number of appeals, 6,000 were withdrawn. Much of the particular success of the *Conseils* in France, or in Paris, was attributed by Mr. Jerrold to the high character and feeling of self-respect in the French artisan,—a feeling, which descended to the class of the rag-picker, and was in great part the national attribute, of paying respect to the *able* man as such—one absolutely different from that of society in England. Mr. Jerrold declared from his own observation, that habits of intoxication amongst the French artisans were almost entirely absent. The French workman spoke not of his "master," but of his "patron." Whether from these national peculiarities, or from the merits of all such institutions, therefore, it appeared, from Mr. Jerrold's inquiries, that the *Conseils* were working well in France, and that (in corroboration of the evidence before the committee) similar institutions might be of a certain value in this country. But the *Conseils* in France could at any time be swept away by a decree of the Government, such as that which re-established them; and in Lyons, in 1831, the attention given to the relations of masters and workmen had not prevented excesses of riot, and in Paris, in 1848, the prevalence of some delusions.

THE WORKS OF ART IN HAMPTON COURT PALACE.

THE state of the pictures here, and perhaps still more of the tapestries, requires immediate attention, if they are considered to be worth preserving. Mr. Henry Cole has recently addressed to us some observations on the subject, wherein he urges that instead of being treated as a mere storehouse, Hampton-court Palace would be a much more attractive public sight if the rooms were *restored as much as possible to their original state of decoration*. He divides the pictures into six classes, and goes on to say,—I would suggest that the works of fine art should be brought to the metropolis where they would be much better preserved, where the facilities for making them available for public instruction would be greatly increased, and all classes of the public infinitely more benefited than by leaving them at Hampton-court Palace, which is visited by the great majority of persons as a palace in the country having beautiful gardens, rather than for the study of works of fine art. The public also possesses pictures and works of art which require constant care, at many institutions, such as the National Gallery, the British Museum, the National Portrait Gallery, Greenwich Hospital, and at the South Kensington Museum, &c. I would suggest that a small committee of consultation, consisting of three artists, with one chemist and one amateur, be appointed to determine what measures should be taken for the preservation of all works of art, either belonging to the public or lent by the Crown for public use, and that premises be provided and skilful persons be chosen for the purpose of carrying into effect, under proper superintendence, the recommendations of this committee.

PRINCIPLES OF DESIGN IN ARCHITECTURE.

ARCHITECTURAL INSTITUTE OF SCOTLAND.

AT a meeting of this Institute, held in Edinburgh on the 6th, Mr. James Gowans read a paper, illustrating some of the principles of design in architecture. Mr. Lessells presided.

Mr. Gowans, after dwelling on internal arrangements, described the style in which the exterior should be constructed, and the mode in which the materials used should be treated; the first step being to meet adequately the requirements of the inmates of the house, and the second to secure a truthful application of the material which the district afforded. The dressings of the building should, he remarked, be executed with light and cheap material, hewn in such a way as to please the eye, without that accuracy of touch necessary in large public buildings. He pointed out how the coloured stone of particular districts did not find fair play in architecture; observing that it it was only when the disposition of these coloured stones was not correct and honest that failure in effect resulted. He had heard it said that it was only in such sunny places as Italy that colour in architecture should be used, and where it could produce its true effect; but he held otherwise; and one of his reasons was, that the deficiency of sunshine in this country called for the application of such material as would give our buildings as cheerful an aspect as possible. With reference to the houses of a larger description, Mr. Gowans instanced his newly-erected mansion at Merchiston-park, Morningside, as an example of the correct principles of architectural design. Whatever might be the effect of that house on the spectator, he assured them that his object in so building it was not simply novelty, but he had endeavoured to erect a building which would put to practical test the system of constructing on squares at fixed angles, thus working out every feature on strict geometrical principles. Another object which he desired to realize was the disposition of colour in the building, so as to assist in developing its general structure and particular parts. Mr. Gowans, in passing, commented upon the importance of thoroughly grounding young beginners in architecture in this anatomy of house-building; so that, instead of borrowing from examples, they might strike out new methods of building, and by mature taste secure a design which would please the eye of the closest critic. He advocated the establishment of a chair of architecture in our colleges, on the ground that architecture had far more to do with our moral and social improvement

than most of us imagined. There should be examinations instituted in such university architectural classes, and diplomas given, to show that a student was well versed in the principles and practical knowledge of the art.

Mr. J. Dick Peddie, in the course of a brief address, observed that the Institute had resolved to have no discussion on papers on the same night as their delivery, but on the succeeding night of meeting. Mr. Gowans had given them some excellent information, but he (Mr. Peddie) did not profess to have much faith in the system of geometrical lines which had been explained. He trusted Mr. Gowans at next meeting would give fuller explanations of this system. But whatever the principles were that Mr. Gowans had worked upon in the erection of his mansion at Merchiston, every one would admit that he had produced a house of highly picturesque effect. He very much doubted whether this effect was the result of the geometrical construction, and also whether it might not have been produced by the ordinary system of architecture. Mr. Gowans reiterated the old complaint against architects, that they were but copyists; but if every architect aimed at producing an original design in house building, the result would be all kinds of monstrosities. The true way was to do as nature dictated, and to make small and gradual steps of improvement in architecture, not to produce new styles. As to Mr. Gowans's remarks regarding chairs of architecture, he agreed with them. We ought in all our universities to have a Professor of Architecture, and it seemed to him to be a disgrace that, in a city like Edinburgh, this art should be so much neglected.

ST. PAUL'S CATHEDRAL.

A COLOSSAL statue of the late General Napier, executed in white marble by Mr. George G. Adams, has been set up near the north entrance to St. Paul's. It is elevated upon a plain pedestal of grey marble, on the face of which is the following inscription:—

CHARLES JAMES NAPIER,
A PRESCIENT GENERAL,
A BENEFICENT GOVERNOR,
A JUST MAN.

It is well spoken of, but we have not yet seen it. We attended the special service there on Sunday evening last, but the building was then too dark and too crowded to examine sculpture. Mr. Penrose's arrangements for the services are more complete than they were, and appear to meet the wants well. He must be anxious, we should think, to get a more satisfactory-looking pulpit than the present. The painting of the flat surfaces in the dome is nearly completed, and a considerable amount of gilding has been done there. When anything is done down below, it is to be hoped that we shall get more colour.

The Rev. Daniel Moore was the preacher, and was heard in every part of the vast edifice by attentive thousands. The effect of the singing, though the organ had been taken down, was admirable.

THE ART UNION OF LONDON PRINTS.

As advertisements have told, each subscriber for the current year will receive, besides his chance of a prize (not at all remote), a volume containing "Thirty Pictures by Deceased British Artists," engraved by W. J. Linton, and a line engraving, by Mr. F. Hall, from the picture called "Come Along," by Mr. J. J. Jenkins. The volume contains "The Corn Field," by J. Constable (an exquisite engraving), Northcote's "Burial of the Princes in the Tower," Reynolds's "Banished Lord," Haydon's "Marcus Curtius," Wilkie's "Rabbit on the Wall," "Death's Door," by Blake; Hogarth's "Marriage à la Mode," Liversiege's "Cobbett's Register," Fuseli's "Witches in Macbeth," Martin's "Joshua commanding the Sun to stand still," Hilton's "Europa," "A Peat Bog in Scotland," by Turner; "The Defeat of the Spanish Armada," by De Loutherbourg; Wilson's "Niobe," Barry's "Victors of Olympia," Etty's "Cupid," "Burlington Old Pier," by Copley Fielding; West's "Death of General Wolfe," poor Müller's "Memnon," Collins's "Cromer," and others.

The volume itself, we have no hesitation in saying, is alone well worth the guinea subscription. It was an excellent idea, and has been exceedingly well carried out. The line engraving, although necessarily simpler than some of the prints issued by the Art Union (the book of engravings being a costly production), bids fair to be extremely popular and much prized. The *Observer* says of it (and in the case of the Art Union of London we generally prefer, for reasons, to give the opinions of others rather than our own),—

"The beauty of the scene, the gentle hills, and the gurgling streamlet; the beauty of the subject, a handsome woman and a lovely female child, and the beauty and harmony of the accessories, all contribute to render this engraving perhaps the most perfect, and certainly the most attractive, that has ever been published by the Art Union of London for distribution among its subscribers. Design, perspective, expression, feeling for the true and the beautiful, are marked in every feature of the original work, and are translated in all but colours by the engraver."

A large subscription, and active proceedings on the part of the council this year, may unquestionably be looked for.

COST OF SEWERS AND PIPES IN PRESTON.

THE following extract from the recently published summary of public works executed during the year ending April 30th, 1859, contains some useful information:—

Yards.		£.	s.	d.	£.	s.	d.
60	of Brick Sewers, 2ft. 6 in. diameter, at 7s.	21	0	0			
538	3ft. by 2 ft., at 17s. 6d.	470	14	3			
294	3ft. 6in. by 2ft. 4in., at 28s.	412	12	11			
372	3ft. 9in. by 2ft. 6in., at 28s.	520	16	0			
250	4ft. 3in. by 2ft. 10in., at 41s. 9d.	521	16	8			
56	4ft. 6in. by 3ft., at 75s. 7d.	211	13	4			
66	4ft. 6in. diameter, at 40s. 9d.	134	9	6			
					2,293	2	8
1,678							
42	of Cast-iron Sewer, 2ft. diameter, at 36s.				75	12	0
22	of Earthenware Pipe Sewer, 6in. diameter, at 4s.	4	8	0			
1,129	9in. diameter, at 7s. 5d.	418	13	5			
565	12in. diameter, at 8s. 9d.	247	2	9			
88	15in. diameter, at 11s. 3d.	49	10	0			
98	18in. diameter, at 13s.	63	14	0			
145	21in. diameter, at 18s. 6d.	134	2	6			
					917	10	8
2,047							
Total, including superintendence, also manholes, street gullies, and all appurtenances					£3,286	5	4

PUBLIC WORKS OF WATER SUPPLY.

44	of 2in. iron pipes, including valves, fire-plugs, outlet-pipes, and all appurtenances, at 1s. 7d.	3	9	8			
1,496	of 3in. ditto, at 3s. 4d.	249	6	8			
321	of 4in. ditto, at 4s. 9d.	76	4	9			
625	of 5in. ditto, at 6s.	187	10	0			
30	of 9in. ditto, at 9s. 6d.	14	5	0			
2,516 yards.					£530	16	1

THE RIGHT OF COUNTY SURVEYORS TO RETAIN THEIR DRAWINGS.

A MATTER of some interest to the architectural profession came before the Norfolk Quarter Sessions on Thursday, the 5th inst. The county surveyor, Mr. Phipson, it appeared, had intimated to one of the committees of the Court that his predecessor in office, Mr. Brown, declined to give up the plans, &c., which he had prepared during the twenty-three years which he had served the county. The ground assigned by Mr. Brown for this proceeding was that, by the usage of his profession, plans were the property of architects, and not of their employers. A correspondence took place in November and December between the clerk of the peace and Mr. Brown's solicitor; but as no amicable solution of the difficulty could be arrived at, the former was instructed to embody the circumstances in a case to be submitted to Mr. Welsby, Q.C. That gentleman, referring to the conditions under which Mr. Brown was appointed, observed that the question was whether the remuneration which he was to receive, and which was to include "all charges for plans, estimates, and attendances," meant only all charges for the labour and skill expended in the preparation of plans, or whether the expression included also the value of the plans themselves. The latter, Mr. Welsby expressed his opinion, was the reasonable construction to be put upon the matter; and he believed the plans had become the property of the persons for whom the work to which the plans related was done. The county magistrates, not being a corporation, could not, Mr. Welsby added, bring an action against Mr. Brown; but he thought the Court might make an order for the delivery of the plans, and that in the event of disobedience an application to the Court of Queen's Bench would result in a *mandamus* being granted to enforce compliance. An animated discussion followed, in which the Rev. E. Postle, the Rev. Lord Bayning, Sir Samuel Bignold, Mr. Fellowes, M.P., the Hon. and Very Rev. the Dean of Norwich, and other gentlemen took part; and eventually the Dean stated that he was authorized by Mr. Brown to "offer to the magistrates to allow the clerk of the peace, or any person appointed within a reasonable time, to make, for the use of the present or future county surveyors, copies or tracings of all plans and specifications for all works executed under his superintendence as county surveyor, or to furnish copies, upon being remunerated for the same." It was also proposed, on the part of Mr. Brown, that the matter in dispute should be referred to two eminent metropolitan architects, with power to call in a barrister as umpire. The Court finally determined to instruct the committee who had turned their attention to the subject to enforce their claim, but to endeavour, if possible, to effect an amicable arrangement before proceeding to legal extremities.

ARCHITECTURAL COMPETITION, HULL.

IN reply to an advertisement put out by Messrs. Jamieson & Son, for re-building their premises, the following architects submitted designs, viz.:—Mr. Brodrick, Leeds; Mr. Brown, Hull; Mr. Petch, Scarborough; and Messrs. Bellamy & Hardy, Lincoln. The design of the last-named gentlemen was selected.

SCENERY AND THE STAGE.

The Princess's Theatre.—Although comparison in such a case is difficult as well as odious, we are very much disposed to say that Mr. Harris has the best pantomime of the season: that is, if we were to examine each under all the heads involved, as, for example, story, scenery, fun, general elegance in getting up, dancing, the actors employed, and so on, Mr. Harris's "Jack the Giant Killer" would get most marks. Miss Louise Keeley is a host in herself, and M. Espinosa certainly one of the most extraordinary ballet-actors that has been seen for a long time. The scenery, painted by Messrs. Gray and Gates, especially "The Queen Bee's Haunt" (a remarkably clever work), and the closing scene, is very satisfactory.

St. James's Theatre.—It was a bold thing on the part of Mr. Chatterton to attempt the production of a pantomime at this house, where there were no properties, no scenery, scarcely a trap in the stage. But the public had so well supported him in his undertaking up to that time, that he felt bound to carry out the traditions, and so, at the cost of more than a thousand pounds, there is, for the first time, a pantomime at the St. James's. Mr. J. Coventry, a name new to us, has produced one or two very pretty scenes, "The Home of the Queen of Mirth," for example, and the whole is very successful.

ART TEACHING AT THE CRYSTAL PALACE

IT is one of the noticeable signs of the present age that the arts of architecture, painting, and sculpture are brought into use in places where formerly they were but little thought of. In taverns curiosities are used as a means of attraction: many have added concert-rooms to their premises, where good music is to be heard; and of late, pictures by good artists have been collected. There is a gallery of pictures by modern painters in one of these concert-rooms that would be worthy of a place in any of the houses of the rich or noble in the land. While this movement is progressing in a satisfactory manner, it is to be regretted that, in some instances, buildings which have been raised for the distinct purpose of advancing the public art and tastes are being turned from their purpose: one of the most important of these is the Crystal Palace at Sydenham. Here have been copied, at an enormous cost, several of the choicest remains of antiquity. There are the temples of Egypt, Greece, and Rome; curiosities of nature, statues, tombs, the effigies of men of eminence of all ages; flowers, both in and out of season; grounds laid out with great skill, and most carefully kept; and from this palace, provided for the people, is one of the sweetest views in England. Yet all these attractions do not seem to be sufficient. Let us hope, however, that this may partly be in consequence of the distance from town at which this rare exhibition is placed, rather than from a want of general appreciation. It certainly sounds strange, in these times, when we pride ourselves on advanced taste and intelligence, when we hear what is going on in the Crystal Palace, a structure in the first instance devoted to the fine arts. At twelve o'clock Mr. Pepper gives an illustrated lecture in the new lecture-hall, but there is at the same time "Punch" in the centre transept. At one o'clock the band performs the "Rifleman's March," and a French clown exhibits his "whimsical performance." At half-past one "The Chantrill Family, show their surprising feats." At two o'clock there is to be seen a troupe of dogs and monkeys,

from Paris, and a celebrated performing elephant. Then come dissolving views, anything but first-rate; afterwards an "inimitable" nigger amuses; and at the close there are grotesque shadows on the great screen. How different is this teaching from that which the sanguine looked for when this palace was first raised. Let us hope that those who throng to see these entertainments may at the same time profit by the more intellectual part of the exhibition which is there provided.

TESTIMONIALS TO THE MANCHESTER EXHIBITION COMMITTEE.

A GALLERY OF ART FOR MANCHESTER.

ON the 6th inst., a meeting was held in the mayor's parlour, at the Manchester Town-hall, for the presentation of a piece of plate to each of the seven members of the executive committee of the late Art Treasures Exhibition.

The seven testimonials are made from one model, in silver oxidized and partly gilt, each consisting of a decorated shaft, surrounded by figures of Painting, Sculpture, and Industrial Art (with their emblems), and crowned by an infant Genius, holding aloft his torch, and in conflict with an eagle. The shaft is decked with the rose, shamrock, and thistle, and the base with laurel and ivy entwined with ribands, bearing the names of great artists. There are also medallion portraits of Michelangelo, Titian, and Cellini, and on circular shields the exhibition building, the arms of Manchester, and the arms of the gentleman receiving the testimonial. The work has been executed by Messrs. Hunt & Roskell, from designs by their artist, Mr. H. A. Armstead.

In the course of the proceedings Mr. T. Fairbairn made an address, wherein he urged the inauguration of an institution, to be dedicated to the arts, which shall be worthy of the wealth and importance and enlightenment of that great city. Let the design of such an institution (he said) be simple and comprehensive: let it be central in its situation: let it be a fitting receptacle for the display of the most costly and the most meritorious works of art,—a home where such works can be well seen and conveniently studied: let it be a free-will offering from the well-to-do among us to those whom we wish to see advancing in prosperity and improving in tastes; and, above all, let it be opened absolutely and entirely free to all, for the sake of the good that it would gradually instil into the public mind; and I will answer for it such an institution shall not lack either noble gifts or public appreciation. I, for one, towards the formation and establishment of such a permanent art gallery, will willingly give my time, money, and whatever energies or influence I possess.

We sincerely hope that the proposition will be immediately acted upon. That such a city as Manchester should be without any public collection of works of art is not creditable or wise.

As to the propriety of the presentation of the testimonials above mentioned, all we can say is, that to justify it, the committee should enjoy in Manchester a very different reputation from what they have in London!

IRELAND.

THE directors of the Newtownlimavady Market Company offer a premium of *five pounds* for plans and estimates for a market-house, to be built near the railway station.

A new Independent church is to be built at Galway, after designs by Mr. Raffles Brown, architect. The Royal Institute in the same town, recently erected, is an important structure, presenting two principal fronts, and arranged internally both for business, scientific, and dwelling purposes, according to plans by Mr. Carson, of Dublin, architect.

The Ecclesiastical Commissioners for Ireland are about having extensive works contracted for in connection with the church of Ardfert, co. Kerry.

The War Department has called for tenders to execute certain alterations and additions at Carrickfergus Castle, in the Belfast district.

The builders of Dublin and an eminent mercantile firm in the timber trade are still at variance as to "string" or "calliper" measurement. Mr. Challoners, of Liverpool, was appealed to, to decide the question; and his statements in reply serve to show that in yellow pine (St. John's) string measure is from 11 to 14½ per cent. less than calliper; birch (St. John's, N.B.) averages 20 per cent. less; Quebec yellow pine, 9½ per cent. less; red ditto, from 8 to 14½ per cent. less; Quebec birch averages 10 per cent. less; Quebec oak, 8½ per cent. less; Dantzic and Memel fir, from 7¼ to 8¾ per cent. less; Riga fir averages 12 per cent. less; and pitch pine, 8 per cent. less. It is difficult to say how the question may end yet.

The new line between Athlone and Roscommon is expected to be opened about the 1st proximo; it is about twenty miles in length.

The estimate of Mr. Hawkesley for the proposed waterworks at Dublin, including the purchase of land and other contingencies, is 218,458*l.* 8s. 5d.

The Board of Public Works are about executing additions and alterations at the Abbey district model national school-house, and seek for estimates.

It is believed that the Conservative Land Society are about effecting improvements in the dwellings of the Irish operatives and peasantry; also introducing the freehold land system into that country.

The design for the memorial about to be erected by Judge Berwick to the late Father Mathew is by Sir John Benson, and comprises a fountain, with basin 24 feet in extreme diameter, with shaft rising therefrom, and supporting two other basins, 8½ feet and 5 feet respectively in diameter. Three dolphins with upturned tails sustain a third basin, above which is a jet, throwing water to a considerable height. Cost, about 150*l.*

Dungarvan has been lighted with gas. Mr. Holloway contractor.

It is proposed, pending the arrangements for the permanent pier and breakwater at Galway, to erect a temporary pier from the point at which the Midland Great Western Railway terminates, to run out as far as the pool, and to cost 3,000*l.**

STAINED GLASS.

St. Giles's Church, Camberwell.—This church, well known as one of the earliest works of Mr. Scott, has recently been adorned with two stained glass windows placed in the chancel, on either side of the great east window. These two new windows represent incidents in the lives of the Apostles, St. Andrew, St. Peter, St. John, and St. James, and have been designed and executed by Messrs. Lavers and Barraud, being paid for by subscription of a few members of the congregation, one of them entirely at the cost of a munificent lady. The committee, who originated this idea, intend, if they are aided by their fellow parishioners, to complete the other four windows in the chancel in the like style, and have already ordered a third to be placed on the south side by Easter next. This window will, in its two lights, represent incidents in the lives of the Apostles, St. Philip and St. Bartholomew.

METROPOLITAN BOARD OF WORKS.

THE SOUTHERN OUTFALL MAIN SEWER.

AT the ordinary weekly meeting of the Metropolitan Board of Works, held on Friday, the 6th, in the council-chamber, Guildhall, Mr. J. Thwaites in the chair, tenders were received and opened for the southern outfall sewer, and were as follows:—Messrs. William Delpech, 330,000*l.*; William Hill, 328,000*l.*; Helling & Co., 315,000*l.*; Joseph Diggle, 328,000*l.*; Edward Thuot, 373,000*l.*; William Moxon, 337,000*l.*; W. H. Rowe, 296,000*l.*; George Baker & Son, 294,000*l.*; Rowland Brotherhood, Chippenham, Wilts, 282,550*l.*; Peto & Betts, 431,715*l.* 9s. 1d.; William Treadwell, 384,536*l.* 14s. 9d. The tender of Rowland Brotherhood, Chippenham, Wilts, was accepted.

THE SANITARY CONDITION OF THE DWELLINGS OF THE POOR.

A communication was received from the Whitechapel Board of Works, calling attention to certain premises now in the course of erection at the rear of Nos. 80 and 81, on the north side of High-street, Whitechapel. It was the intention of the persons erecting the premises in question to construct three houses, in which it was probable that not less than seventy-two persons would reside. The site selected was a pent-up *cul de sac*, with a covered entrance to High-street, Whitechapel, only 5 feet wide, decreasing in width to 3 feet 10 inches, and the height only 8 feet 6 inches. The notice went on to state that the Board viewed with the most serious apprehension this system of constructing dwelling-houses for the poor as subversive to the great end to be accomplished in sanitary regulations, and earnestly requested the Board of Works to cause a special inquiry to be instituted into the matter. A somewhat similar instance existed in Inkhorn-court, also on the north side of High-street, Whitechapel, the entrance to which was between the houses 89 and 90, to which their especial notice was also solicited.

The matter was referred to the superintending architect to report upon.

THE ORDNANCE SURVEY OF LONDON.

A report was brought up from the Main Drainage Committee on the arrangements entered into by the committee with the Treasury for the settlement of the claim for the Ordnance survey of London. The report stated that the committee had communicated with the War Department, and had arranged with them that all claims against the Board of Works should be settled by the payment of 10,000*l.* The War Department was to take the plates of the maps, and vestries were to be supplied at a cost only equivalent to their cost to the Government—namely, 1s. per sheet. The original claim had been 24,212*l.* 17s. 8d.

* With reference to a note in a recent number, as to the fall of a portion of the works at John's-lane distillery, the architect wishes us to state that it was simply a few perches of brickwork which were thrown down by the accidental upsetting of a water-tank.

THE TRAMWAYS ON WESTMINSTER BRIDGE.

SIR,—As a great public work must necessarily be open to a certain amount of criticism from that portion of the community who are interested in its utility and successful completion, I feel somewhat inclined to think that the following query will arise regarding the system of tramway adopted on the new part of Westminster-bridge (the privilege of inspecting which the public have now an opportunity of enjoying, by a birds'-eye view while passing over the west side of the present structure).

It will be observed that there are two trams in the new roadway, for carriages of various construction; and I presume it is intended that the stream of vehicles should travel reversely. Now I would draw attention to the *very small space between these trams*, and suggest that it would be impossible for many heavily-laden waggons *to pass* each other when the burthen they contain hangs over their wheels on either side, even an ordinary distance. I would instance the frequent transit of waggons containing the huge sacks of hops. It would be, I need not say, most unfortunate for two such to meet in the centre, as it would entail the necessity of the one or other retiring by a backward movement.

Of course I may be speaking in ignorance of better and more matured arrangements, but I venture to submit my ideas humbly to your notice.

H. C.

THE FOUNDLING HOSPITAL AND BRITISH ART.

YOUR account of the Foundling Hospital and of the congenial efforts of Hogarth and others in 1760 to maintain as well as to embellish that asylum is highly interesting and instructive.

If you would pursue the subject a step further, and supply in more detail the catalogue of the men offering to appear in a Foundling uniform at their next "festival," it would be of great value to the illustrators of the art of that interesting but only half-explored period; when, indeed, we may say, art itself was but a deserted bantling making its first step into existence, and struggling into the full light of public favour. That 7th of December, 1760, may be looked back to as the first dawn of hope for native art, which had just made a probationary effort to "exhibit" itself at the room of the Society of Arts in the Strand, and which was the first of a succession of exhibitions leading on to that of the Royal Academy.

As to the list printed in your number, I could point out sundry slight errors; but if you would supply it correctly, as entered, I should have to thank you for myself and many others interested in the inquiry.

Several of the names are to be found in the catalogue of 1760 and the succeeding years. H. M. Spang, for example, was a sculptor by whom I have a statuette in terra-cotta of Hogarth in the act of making a sketch by stealth, but of whom I find no other trace than that of his being an exhibitor by the side of Roubiliac, Wilton, and Hogarth, at that period.

J. H. A.

*** Our list was printed from that given by Mr. Brownlow. Since the receipt of our correspondent's letter, Mr. Brownlow has kindly enabled us to see a copy in *fac simile*, and we have found one or two inaccuracies: for example, the fifth name on the list, instead of William Chambery, is William Chambers, the architect of Somerset House; and Nathaniel Honey is Nathaniel Hone. T. White and G. Whatley, it may be well to mention to save speculation, were the treasurers of the hospital.

Books Received.

Moral Emblems, with Proverbs of all Nations; from Jacob Cats and Robert Fairlie. With Illustrations by John Leighton, F.S.A. Translated and edited, with additions, by RICHARD PIGOT. London: Longman, Green, & Co. 1860.

THIS is a beautiful specimen of typography, wood-engraving, and bookbinding; founded, with considerable skill and intelligence, on an existing body of world-wisdom. The binding is especially elegant, a design probably of the illustrator, Mr. John Leighton, the results of whose skill as a designer of such matters are well known to the public, though they may attribute them to one "Luke Limner." Mr. Leighton has always inclined to typification and symbolical representations; and, in setting forth the works of Jacob Cats, as originally illustrated by Jan and Adrian Van de Venne, he has found a labour that was a delight, and has succeeded in consequence: true indeed it is, the labour that we love "physics pain." Written in Dutch and Latin verse, the Moral Emblems and Proverbs of David Cats are almost unknown in England: they form a code of moral instruction, addressed to the youth of both sexes, and applicable to most phases of life. In addition we have pertinent quotations from the ancient authors, the poems of his contemporary, Robert Fairlie, and a collection of proverbs of all nations. Some of the illustrations are remarkable specimens of wood-engraving. We cordially recommend the book, whether to the scholar, the lover of proverbial philosophy, or the young.

VARIORUM.

"THE Engineer's, Architect's, and Contractor's Pocket Book, for the Year 1860" (Lockwood & Co., Stationer's Hall-court) contains (for a pocket book) an immense variety of useful matter, such as an epitome of mensuration, the memorandum book of Mr. Telford, the engineer, tables and general information as to sewers, carpentry, strength of materials, woods, stone, coal, iron, brass, steel, and copper; hydraulics, water-wheels, and a multiplicity of other matter, besides the usual almanac materials, and lists of the office-bearers and members of the Royal Institute of Architects, and Institution of Civil Engineers. ——"Who's Who," edited by C. H. Oakes, M.A. (Baily, Brothers, Cornhill) has established for itself a distinguished position as an index to everybody who has anything like a handle to his name, titular or official. The present volume (for 1860) is the twelfth issue, and is dedicated to her Grace the (truly graceful) Duchess of Sutherland.

TENDERS

For forty cottages to be built in Hereford. Mr. J. H. Evins, architect:—

Biggleston & Bowers (James)	£2,419	10	0
Stone & Bowers (William)	2,178	7	11
Price	1,970	0	0
Bannister	1,887	0	0

For Works to St. Saviour's Church, Southwark, Mr. Edward Habershon, architect. Quantities not supplied. The Tenders were sent in with two amounts, one for the screen-walls in brickwork, and the other in stone:—

If screen-walls in brickwork,—

Myers	£1,134	0	0
Rider	1,108	0	0
Tarrant	1,092	10	0
Carter	1,074	0	0
Downs	1,068	0	0

If screen-walls in stone,

Myers	£1,194	0	0
Rider	1,176	0	0
Tarrant	1,158	0	0
Downs	1,157	0	0
Carter	1,149	0	0

The screen-walls in brickwork were decided upon, and consequently Downs's Tender was accepted.

For dwelling house, Hornsey-rise, for Mr. A. Davenes. Mr. T. W. Constantine, architect:—

Nash	£1,965	0	0
Serjent	1,719	0	0
Fowler	1,677	0	0
Lown	1,320	0	0

For alterations, &c., at Bowes Manor, Southgate, for Mr. Alderman Sidney; Mr. E. Woodthorpe, architect. Quantities not supplied:—

Piper	£1,295	0	0!
Jeffrey	1,180	0	0
Williams	1,144	0	0
Carter	1,037	0	0
Fidler	659	15	0!

For underpinning about 2,000 feet run of brick sewer in Bishop's-road and Westbourne-grove, Paddington. Mr. W. Merry, surveyor:—

Thirst	£669	0	0
Pearson	491	0	0
Batterbury	468	0	0
Rowe (accepted)	437	0	0
Surveyor's estimate	450	0	0

For workshops, Addle-hill, [E.C., for Mr. McDougall; Mr. W. Hudson, architect:—

Burton	£650	0	0
Child, Son, & Martin	634	0	0
Pritchard & Co.	631	0	0
Brown & Robinson	623	0	0
Newman & Mann	618	0	0
Jeffs	598	0	0

For new school, &c., for the Rev. Mr. Bird, Lower Belgrave-street. Quantities supplied:—

Higgs	£1,280	0	0
Jeffs, Brothers	1,132	0	0
Fish	975	0	0

Miscellanea.

OIL FOR PAINTERS.—Oil extracted from the seeds of grapes is recommended as an excellent medium for painting.

SOCIETY FOR THE ENCOURAGEMENT OF FINE ARTS.—At the adjourned annual meeting of this society Mr. H. Ottley (the chairman) said that the society intended to give two prizes in painting. One would be a square ivory or wood pallet, the "Reynolds pallet," with a silver handle; and that which would be awarded for landscape, or *genre*, would be a silver pallet. A bronze medal would be given for sculpture, and also for architecture.

THE PURCHASE OF ASTON HALL.—This purchase, of late regarded as more than doubtful, is now, it is thought, placed on a surer basis. The shareholders have paid 7,000*l.* towards the purchase, and the remainder—about 25,000*l.*—was to be paid in the course of this year, or the purchase would lapse, and the deposit already paid be forfeited. The owners of the hall have agreed to accept new terms. They stipulate that the Interim Managers shall pay 3,000*l.* at once, and thus raise the paid sum to 10,000*l.*, and that the payment of the rest of the purchase-money shall be spread over ten years, if not closed at an earlier period.

FALL OF HOUSES IN SALFORD.—During Sunday last two accidents to dwelling-houses occurred in Salford, but fortunately they were not attended by personal injury. About three o'clock in the morning, the front wall of a two-story house in Cross-street, Bury-street, fell with an alarming crash, and rendered the place a ruin. The second accident occurred in Queen-street, soon after two o'clock on Sunday afternoon. A labouring man, named Jones, was about to sit down to dinner with his family in the upper front-room of a cottage house in that street, when there came a loud crack, followed by two others, and a noise "like thunder," as the neighbours declare. The wood-work of the roof had yielded, and the whole mass dropped inward, until it bore upon the top of a four-post bed, in the middle of the room.

ANNUAL MEETING OF THE EMPLOYED AT POOLE SOUTH-WESTERN POTTERY.—On the 2nd inst., the whole of the men engaged at Mr. Geo. Jennings's works, together with their wives or friends, according to the annual custom of this establishment, sat down together at the pottery works, to tea. The company were upwards of 200 in number. The tea being concluded, a clearance was effected, and arrangements completed for the evening meeting. At the head of the room a temporary platform was erected, and, arranged on a high table immediately in front of the company, was a collection of electrical apparatus, which in the course of the evening was used for experiments. The meeting was addressed by Mr. J. S. Hudson, the manager of the pottery, and by Mr. G. De Chaville and others, and a lecture on electricity was delivered by Mr. W. Coward.

INAUGURATION OF THE NEW CORN EXCHANGE AT KIRKALDY.—The completion of the new Corn Exchange at Kirkaldy has just been celebrated by a public dinner, given in the Exchange, and numerously attended. The site of the new building is in Cowan-street, immediately adjoining the old market, and it is intended to serve for a public hall as well as a corn exchange. The dimensions of the hall are 84 feet by 68. The roof, which rises considerably in the centre, is supported by two rows of pillars placed at regular intervals along the entire length of the hall, at a distance of about 20 feet from the side walls. The height of the hall is about 40 feet in the centre, and 29 feet along the sides. The hall is lighted along the east side, and windows are also placed to the north and south: at the west side there are several doors giving access to side-room accommodation; and any deficiency of light at the west side is compensated by the raised portion of the roof being glazed on both sides. The Exchange will, it is estimated, accommodate about 2,000 people; and it has been erected at a cost of about 2,500*l.*, the architects being Messrs. Hay, of Liverpool.

NEW APPROACH TO THE TEMPLE CHURCH.—In a short time a new approach will be made to the Temple Church, from Fleet-street, opposite Chancery-lane. A part of Inner Temple-lane is to be demolished, as also Churchyard-court; and other improvements, it is said, are to be commenced forthwith in that neighbourhood.

THE LINCOLN FRANKLIN MEMORIAL.—The sum of 1,500*l.* had been subscribed for a memorial to Sir John Franklin, at Lincoln, and the corporation voted 1,000*l.* to purchase a site in a square in the parish of St. Swithin. To carry out the plan a footpath in the square would have to be diverted: this the parish declined to allow, by a majority of twenty-nine, on a poll, and the money subscribed has consequently been returned to the donors.

STEEL BELLS.—Messrs. Naylor & Co., of Sheffield, have lately cast the largest steel bell yet made. The height is 5 feet 3 inches, diameter at the mouth, 6 feet 2 inches, and thickness at the sound bow, 4½ inches. The bell weighs 2 tons 12 cwt., or 5,824 lbs., and is destined for San Francisco, where it is to sound an alarm for fires.

THE DRINKING-FOUNTAIN MOVEMENT.—The Metropolitan Free Drinking-fountains Association has received the sum of 100*l.* from the executors of the late James Dennington, esq., of Clerkenwell, being a bequest of that gentleman.

MANUFACTURE OF IRON.—Mr. H. W. Nevill, of Llanelly, has patented an invention which consists in making the molten metal, as it runs from the blast furnace, fall from an elevated position upon a conical surface, which throws it off into the surrounding atmosphere in globules. The globules are puddled, and the balls treated as usual. The granulation of iron direct from the blast surface, and the manufacture of iron by the usual process, from the globules, has long been invented.

CAYTHORPE CHURCH STRUCK BY LIGHTNING.—In a late thunderstorm at Caythorpe, the church was twice struck by the lightning, and damaged to such an extent that it will require some hundreds of pounds, it is said, to make the necessary repairs. The vestry and one of the windows were first struck, with such force that a part of the roof fell in, and of course serious damage was done to the interior by the falling materials. A few minutes afterwards, another vivid flash enveloped the entire building in one mass of flame for several moments; and, when the glare had passed away, it was found that about 9 feet of the upper part of the steeple had been knocked off, and had fallen through the roof, some of the pieces of stone weighing several cwt. each. The unfallen portion of the tower was very much shattered, and split almost into quarters. Nearly all the ornamental carving on the steeple was destroyed. Was there a lightning conductor? In all probability there was not—at least a proper one.

GAS.—A public meeting of the gas consumers of Pimlico has just been held in support of the delegates from the parish in their application to Parliament to protect the gas consumers against the combination of the gas companies. Sir J. V. Shelley occupied the chair.——At Dingwall, complaint is made of the quality of gas manufactured there. "As we believe," says the *John O'Groat Journal*, "that there is no town in Scotland paying more for gas than Dingwall (13s. 9d. per 1,000 feet), the consumers have a right to expect that the quality be pure. A similar complaint as that referred to may easily be made with reference to Wick. Here the price of gas comes close up to that paid by the inhabitants of Dingwall; while, if their gas is worse than that of Wick, they are to be pitied." The people of Wick and Dingwall ought to agitate in the first place for cheap gas: they may as well have it cheap and bad as dear and bad. The companies will then discover that, in order to bring up their profits to the required standard, they must set to work in earnest to occupy the ample field of private dwellings which exists in every ordinarily populous town; and that to secure this field they *must* make their gas purer. The inhabitants will thus have the benefit of gas both good and cheap, in place of bad and dear.—— An invention has been patented, which consists in the use of vapours, obtained at a comparatively low temperature, under boiling point, from hydrocarbon liquids of *high* boiling point, such as coal-oil, or spirit of turpentine, for the impregnation and enrichment of ordinary gas; such vapours having less tendency to condense before combustion. The patentee is Mr. John Amsterdam. ——The directors of the Plymouth and Stonehouse Gas Company have again declared a dividend, for the past six months, of 10 per cent. on the old shares, and 7½ per cent. on the new.—— The Huddersfield Gas Company have reduced the price of gas from 4s. to 3s. 6d. per 1,000 feet.

WALTER MACFARLANE & Co

IRON FOUNDERS AND SANITARY ENGINEERS, SARACEN FOUNDRY, GLASGOW,

PATENTEES and MANUFACTURERS of PUBLIC SANITARY APPLIANCES,

No. 2, Water-closet Range.

For DWELLINGS, SCHOOLS, ASYLUMS, BARRACKS, RAILWAYS, STREETS, &c.
URINALS, Single, Double, and in Ranges.
WATER-CLOSETS, Single and in Ranges.
WASH-HAND BASINS, Single and in Ranges.
WASH-FOOT BASINS, Single and in Ranges.

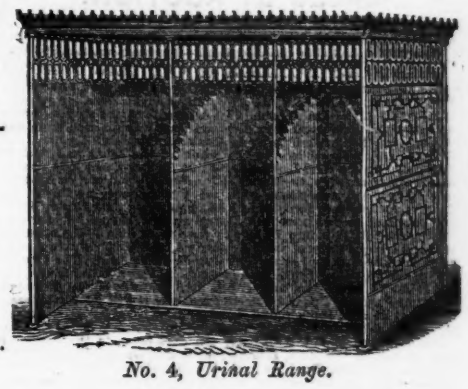
Composed wholly of CAST IRON; now in use in every large Town in the Kingdom, as well as the Colonies, and on the Continent.

LONDON HOUSE,

Mr. THOS. BEGGS, 37, Southampton-street, Strand, General Depôt for Sanitary Articles, and Plumbers' Brass Work.

Agents for the Counties of Northumberland and Durham.

HENRY WALKER AND CO. NEVILLE IRON WAREHOUSE, NEWCASTLE-ON-TYNE.



No. 4, Urinal Range.

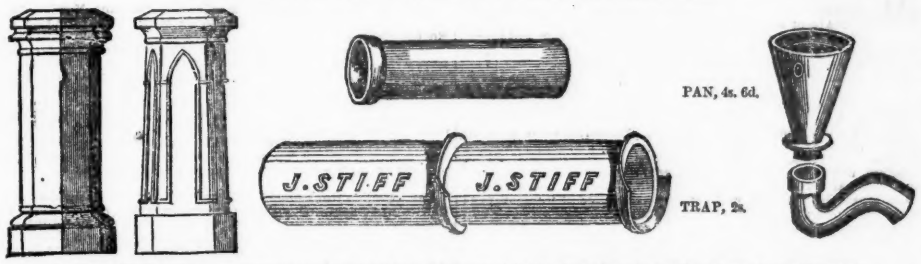
JAMES STIFF,

MANUFACTURER OF GLAZED STONEWARE DRAIN-PIPES, WATER-CLOSET PANS, SINK-TRAPS, INVERT BLOCKS, AND ALL OTHER ARTICLES SUITABLE FOR DRAINAGE PURPOSES; ALSO

IMPERISHABLE TERRA-COTTA CHIMNEY-TOPS, FLUE-PIPES, COPINGS, GARDEN EDGINGS, &c.

LONDON POTTERY, HIGH-STREET, LAMBETH, LONDON.

STRAIGHT TUBES, with SOCKET JOINTS, in Two-feet Lengths.



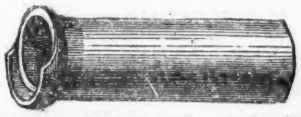
HALF-SOCKET PIPES same prices as the Whole Sockets, by the use of which Drains may be readily examined, and Junctions INSERTED, IN THE EVENT OF REQUIRING FURTHER CONNECTIONS.

May be had also at the following Wharfs, viz.:—
Messrs. GLADDISH'S, Pedlar's-acre, Westminster-bridge-road; City-road Wharf, City Basin; Dockhead Wharf, Bermondsey; Danvers Wharf, Chelsea; Pratt Wharf, King's-road, Camden-town.
Messrs. COLES, SHADBOLT, and CO.'S, St. James's and Thornhill Wharfs, Caledonian-road, Pentonville.
Messrs. RITCHIE and SMITH'S, Ravensbourne Wharf, Greenwich.
Mr. LAVERS'S, Dowgate Wharf, Canal-road, Hoxton.
Mr. HENRY TURNER'S, 2, South Wharf, Praed-street, Paddington.

DRAWINGS, WITH PRICES, WILL BE FORWARDED FREE, ON APPLICATION.

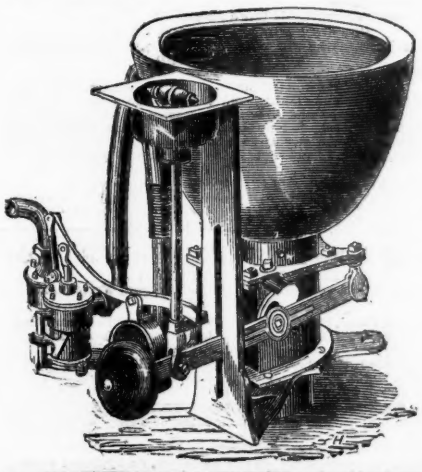
STEPHEN GREEN AND CO.'S

GLASS-LINED AND SALT-GLAZED SANITARY GOODS.



FLUSHING CLOSETS, URINALS, CHIMNEY FLUES, &c.
IMPERIAL POTTERIES, LAMBETH.

J. TYLOR & SONS' PATENT REGULATOR WATER-CLOSETS.



J. TYLOR & SONS' PATENT REGULATOR WATER-CLOSETS will be found to combine advantages hitherto unknown in the improvements in Water Closet Apparatus. Without any separate cistern apparatus, cranks, or valves, they ensure the supply of water to any desired height in the basin, either on the low or high-pressure service, however quickly or carelessly used.

By the simple adjustment of the small tap shown in the annexed engraving, the closing of the valve is regulated to admit any desired amount of water. Only one joint requires to be made to fix them, care being taken that none of the scrapings of solder drop into the valve.

J. TYLOR & SONS,
WARWICK LANE, NEWGATE STREET,
LONDON, E.C.

ESTIMATES GIVEN FOR HOT-WATER AND BATH APPARATUS.

Catalogues sent on Application.

JOHN DOULTON, BROTHERS, AND CO.

LIVERPOOL POTTERY,
ST. HELEN'S.
STORES—70, SOHO-STREET, LIVERPOOL.

MANUFACTURERS OF

DOULTON'S STONEWARE PIPES,
DOULTON'S HALF-SOCKET PIPES,
DOULTON'S INVERT BLOCKS FOR SEWER BOTTOMS,
DOULTON'S PATENT JUNCTION BLOCKS,
TERRA-COTTA CHIMNEY-TOPS, FIRE-CLAY FLUE-PIPES, RIDGE AND PAVING-TILES, &c.

"WRIGHT'S PATENT" SELF-ACTING WATER-CLOSET.

This Water Closet is so constructed as to be free from all the defects of the Water Closets in general use. It is simple in construction, and perfect in action, can be readily fixed by any ordinary plumber, and does not easily get out of order.

It is self-acting, and its action is equally certain, whether used by children or grown-up persons.

It has no pan and receiver with their accompanying cranks and wires.

No effluvia can escape into the dwelling, as the flush is perfect and instantaneous.

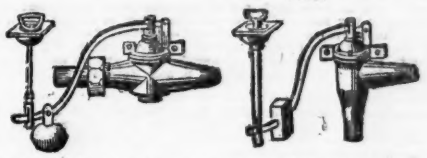
It is free from noise during the flushing operation. And any desired quantity of water can be used in flushing, so that in situations where water is scarce the expenditure can be economised.

May be seen in ACTION at the EXHIBITION of BUILDING MATERIALS, open at the GALLERIES of the ARCHITECTURAL EXHIBITION, 9, Conduit-street, Regent-street, London. Free.

All information respecting the above will be given by Mr. MOODY, the Curator, at the Galleries.

HEWETT, ALLOTT, and WALKER,
SHEFFIELD,
SOLE PROPRIETORS AND MANUFACTURERS.

LAMBERT'S SELF-CLOSING LAVATORY AND CLOSET VALVE No. 7.



is adapted for high or low pressure, and for any kind of BASIN. Many hundreds are in use under continuous pressure of 100 to 200 feet; they are found to be exceedingly durable, and are cheaper than common cocks. Manufactured solely by the Patentees,

THOMAS LAMBERT and SON,
BRASS-FOUNDERS AND ENGINEERS,
Corner of Short-street, New-cut, Lambeth, S.

N.B.—No. 7, combined with a DOULTON'S PAN and TRAP, is the CHEAPEST COTTAGE CLOSET yet produced.
Price, complete, 13s. 6d. each.

POLONCEAU and LIMMER ASPHALTE.

ESTABLISHED 1838.

For covering Flat Roofs, Paving and Flooring of every description, especially in places subject to damp and vermin. This Asphalte is now extensively used for paving Stables (as shown above), the absence of joints preventing the generation of ammonia.—For Estimates and Prices, &c. apply to JOHN PILKINGTON, 15, Fish-street-hill, London, E.C.

Country Builders supplied with Asphalte in bulk for covering Footings, Barn Floors, &c. with instructions to lay it down.

PRIZE MEDAL, LONDON, 1851.
GOLD MEDAL, PARIS, 1844.

ARMANI and CO. Importers direct from

the Mines of SEYSSEL-FRANGY (Savoy), SEYSSEL-VOLANT-PERRETTE (Savoy), MAESTU and MONTORIA (Spain), BASTENNES (Landes), &c. &c.

SEYSSEL ASPHALTE,
And by H.M.'s Royal Letters Patent, Manufacturers of
METALLIC LAVA.
For Price and Estimates apply at the
OFFICE, 6, GUILDHALL-CHAMBERS, BASINGHALL-STREET.

CROGGON and COMPANY,

Manufacturers of
PATENT ASPHALTE ROOFING,
BOILER, RAILWAY, SHEATHING, and INODOROUS FELT,
For Damp Walls and Lining Iron Houses.
2, DOWGATE-HILL, London; and 2, GOREE PIAZZA, Liverpool.

ASPHALTE—TRINIDAD—SEYSSEL—

MINERAL TAR.

THOS. HARRISON and CO. having now a regular supply of ROCHE ASPHALTE and MASTIC MINERAL TAR from France, can undertake to execute any Work Asphalte of the very finest Seyssell, quality, as well as Trinidad and British Asphaltes, on the most reasonable terms.

PREPARED { for every description of Building, Railway, and Agricultural Work.
TEMPERED { for every purpose, situation, and export to every climate.

Rendered of uniform consistency by Steam Power.
The Trade supplied on advantageous terms, and estimates given or works of any magnitude; also for
LAYING TAR PAVEMENT.

THOMAS HARRISON and CO.
ASPHALTE, WHITING, AND PAINT WORKS:—
Cambridge-heath Wharf, Hackney;
Sunderland Wharf, Rotherhithe;
City Offices, 19, London-street, E.C. opposite the Blackwall Railway.

GOUGH'S CELEBRATED PATENT

PORTABLE and FIXED STEAM-ENGINES, STEAM MORTAR MILLS, STEAM PILE-DRIVERS, STEAM CRANES, CIRCULAR SAWS, Patent DOUBLE-ACTION SYPHON, LIFT and FORCE PUMPS.

AT REDUCED PRICES FOR 1860.
Apply to HENRY GOUGH, Engineer, Manchester,
Established 1816.

SALES BY AUCTION.

Surplus Lands of the London, Brighton, and South Coast Railway Company.—First-class Building Land.—Norwood Junction Station.

FRANCIS FULLER & CO. have received instructions to SELL by AUCTION, at the Mart, London, on THURSDAY, JANUARY 26, 1860, about eight acres of superior BUILDING LAND, in 30 Lots. This land adjoins the station, where seventy-eight trains now stop daily, on their way to and from the stations at London-bridge and Pimlico, Croydon, Epsom, and Reigate, and from thence to the whole of the south and west of England. By the West London Extension Railway, which is now in course of construction, the Norwood Junction Station will be brought into direct communication with all the railways north of the Thames, by which passengers will be enabled to travel from Wales and Scotland to Brighton and Dover without change of carriage. The public will, therefore, be able to form some idea of the ultimate value and importance of land so situated, which is, therefore, with great confidence described as first-class building land. The Crystal Palace and grounds, replete with instruction, and admirably adapted for healthful recreation, are within four minutes of the Norwood Junction Station. Under these circumstances it will readily be seen that few, if any, spots round London have so great a chance of becoming the centre of a large and important district as the land in question.—Particulars will be ready ten days prior to the Sale, and may be had at the Mart, London; of Messrs. George FAITHFULL & SON, Solicitors, Brighton; at the Secretary's Office, London-bridge; of the Station-masters at New Cross, Forest-hill, Sydenham, Norwood Junction, Croydon (East and West), Epsom, Redhill, and Brighton: also at the White Hart, Bromley; of Messrs. FULLER & WITHALL, Architects and Surveyors, No. 21, Parliament-street, Westminster; and of the Auctioneers, No. 10, Cornhill, E.C.

WESTMINSTER BRIDGE APPROACHES.—SECOND SALE. BUILDING MATERIALS.

MESSRS. GLASIER & SON are favoured with instructions from the Commissioners of Her Majesty's Works and Public Buildings, to SELL, by AUCTION, on the Premises, on MONDAY, JANUARY 16, at TWELVE for ONE, the valuable BUILDING MATERIALS of three houses with shops, Nos. 26, 27, and 28, Bridge-street, Westminster, comprising capital sound stock brickwork, slates, timber in roofs, floors, &c.; flooring, wainscoting, shop fronts, sashes and frames, doors, several tons of lead in flats, gutters, pipes, cisterns, &c.; iron columns, paving, fixtures and fittings.—May be viewed the day prior and morning of Sale; and Catalogues had at the Office of Works, 12, Whitehall-place; of JAMES PENNETHORNE, Esq. 7, Whitehall-yard; on the Premises; at GARRAWAY'S; and of the Auctioneers, 41, Charing Cross, S.W.

BATTERSEA RISE, SURREY.—Well-built Leasehold Residences and Shops, with the good-will of an old-established and profitable Business.

MR. STEVENS is instructed by the Proprietor to submit to PUBLIC COMPETITION, at the AUCTION MART, opposite the Bank of England, on THURSDAY, JANUARY 19th, at TWELVE for ONE o'clock precisely, the LEASE of capital BUSINESS PREMISES: comprising TWO HOUSES with large shops, to one of which is attached the trade of a Builder, Plumber, and general Contractor, &c. situate in the increasing neighbourhood of St. John's-road, Battersea-rise, near Clapham-common, and offering an excellent opportunity for extending connection; together held on lease, having about eighteen years' remainder, at the extremely low rent of 37*l.* per annum.—May be viewed by orders from the Auctioneer. Particulars and conditions of sale at the Mart; of Mr. RICHARD PRALL, Solicitor, 19, Essex-street, W.C.; at the Estate Exchange, opposite Garraway's, E.C.; and at the Offices of the Auctioneer, Clapham-common, S. and Harriet-street, Lowndes-square, S.W.

To Builders, Timber Merchants, Barge Builders, and Others.—Important Sale.—Regent-street, Westminster (adjoining the Telegraph).—On WEDNESDAY next, JANUARY 18th, at TWELVE o'clock (on account of the number of lots),

MESSRS. F. HALL & SON will SELL by AUCTION, as above, about 2,000 long yellow and white DEALS, 200 pine plank and deals, 200 ditto, cut various; 5,000 feet of wide pine board, 200 squares of yellow and white flooring, 2,000 feet of dry oak and elm plank and boards, 300 first quality white deals, 500 long battens, 5,000 feet of long quartering. Also, the remaining portion of the cabin doors, chests of drawers, and other fittings, out of that splendid vessel, "The Oronoko," now breaking up.—On view, and catalogues had on the Premises, and of the Auctioneers, Kennington, S.

IMPORTANT TO BUILDERS AND DECORATORS.

MR. EDWIN WHITE will SELL, without reserve, at his ROOMS, 12, Holborn-bars, and 1, Castle-street, Holborn, on TUESDAY, JANUARY 24th, about 7,500 pieces of first and second class PAPERHANGINGS and FRENCH BORDERS, a number of superbly-sculptured statuary marble chimney-pieces, well-wrought black and veined marble chimney-pieces, and a pair of life-size classical figures.—View and catalogues day prior and morning of sale.

FOR SALE by PUBLIC AUCTION, in the SALE-ROOM, at F. K. BARNES and SONS' TIMBER-YARD, Canons' Marsh, Bristol, on WEDNESDAY, the 25th of JANUARY, 1860, at ONE o'clock precisely. (Luncheon at Half-past Twelve.)

For account of Importers.

20,000 Spruce Deals, Battens, and Boards
1,000 Quebec Pine Deals
1,500 Richebuctoo Pine Deals
3,000 St. Petersburg Red Deals
2,000 Archangel Deals
1,000 Onega Red Deals
1,000 Onega Red Boards
2,000 Swedish Redwood Deals
60 Loads Fresh Large Curly Prince Edward's Island Birch
100 Loads Large St. John Board Pine Timber
200 Loads Fresh St. John Yellow Pine
100 Loads Quebec Yellow Pine Timber
30 Loads Quebec Oak
200 Loads Danzic Timber
50 Loads Danzic Oak
250 Loads Swedish Timber
1,500 9 feet 9 by 9-inch Danzic Redwood Sleeper Blocks
20 Fathoms St. Petersburg Lathwood
10 Fathoms Hemlock Lathwood
1,000 Quebec Pipe Staves
5,000 W. I. Puncheon ditto
200 Norway Masts
600 4 to 6-inch Spars
300 4-inch ditto
300 Rickers
10,000 Palings
Prepared Flooring
Mahogany
With other Goods.

Catalogues will be issued on the Week of Sale.

F. K. BARNES & SONS, Brokers.

Canons' Marsh, Bristol, January 11th, 1860.

CROSBY HALL, Bishopsgate-street Within, City of London.

MR. THOMAS FOX begs to announce that having SOLD the LEASE of the above Property, he is instructed by the Proprietors to SELL by AUCTION, early in FEBRUARY, 1860, the noble ORGAN of the above Hall, built by Lincoln, in handsome case of Gothic design, with compass from C C to F, and 27 stops; together with the whole of the Antique Furniture, and about 5,000 feet of 1-inch flooring, quantity of raised benches, and other effects.—Catalogues and particulars of the organ to be had one week prior to the Sale; and the organ may be viewed until the Sale, by cards, to be had at the Offices of Mr. THOMAS FOX, Auctioneer and Estate Agent, 93, Bishopsgate-street Within, E.C.

CARRARA WHARF, THAMES BANK.—Marble in Block and Slab.

MESSRS. EVERSFIELD & HORNE are instructed by Messrs. Fabbricotti, Brothers, to SELL by AUCTION, on the PREMISES, Carrara Wharf, Thames-bank, Pimlico, on WEDNESDAY, 25th instant, at ELEVEN for TWELVE precisely, a large assortment of MARBLE, comprising Statuary of fine dimensions for sculpture or manufacture—Vein, Sicilian, Dove, Bardilla, Paonazza, Black, &c. in blocks; also several thousand feet of SLABS—Vein, Sicilian, Dove, Black, Bardilla, Black and Gold, and Statuary (English sawn). Approved bills at four and six months.—May be viewed two days previous, and Catalogues had on the Premises, and of the Auctioneers, 40, Parliament-street, Westminster, S.W.

Valuable Freehold Manufacturing Premises, with covered Rope-ground, at Old Ford, Bow, with early possession.

MESSRS. PRICE & CLARK will SELL by AUCTION, at GARRAWAY'S, on TUESDAY, JANUARY 31, at TWELVE for ONE, the important property, known as VICTORIA-PARK MILLS, situate a short distance from the Victoria-park and Bow Stations, on the North London Railway, possessing the advantages of direct water carriage, having a frontage to Sir George Duckett's Canal, and easy road transit to the City, from which it is distant but three miles. The premises include a substantial and well-lighted pile of buildings, with engine and boiler-house, 28 horse power steam-engine, lofty chimney shafts, warehouse, long covered shed, counting-house, coach-house, and stabling, a covered rope-ground, 200 fathoms in length, and large open yard, entrance-gates at the foot of the bridge crossing the canal, communicating with Victoria-park and Old Ford-road, the whole being let at the inadequate rent of 225*l.* per annum.—May be viewed by permission of the tenant, and particulars had of Messrs. BOLTON, BELFOUR, & BOLTON, 4, Elm-court, Temple; and at PRICE & CLARK'S Offices, No. 48, Chancery-lane.

By Order of the Mortgagee.—Nos. 1 to 6, and 11, 15, 16, 17, and 18, Edward-square, Caledonian-road, Islington.—To Small Capitalists.

MR. W. F. HAMMOND is instructed to SELL by AUCTION, at the MART, on FRIDAY, JANUARY 20, at TWELVE for ONE, in separate lots, the ELEVEN LEASEHOLD HOUSES, held at ground-rent varying from 2*l.* to 10*l.* each, for a term of about 84 years, and let at rentals amounting to 310*l.* Particulars of sale to be had of T. H. STRANGWAYS, Esq. Solicitor, No. 16, King's-road, Bedford-row; at the Mart; and at the Estate Agency Offices, 3, Carey-street, Lincoln's-inn, W.C.

By Order of the Mortgagee.—Leasehold Ground-rent, secured on No. 12, Edward-square, Caledonian-road, Islington.

MR. W. F. HAMMOND is instructed to SELL by AUCTION, at the MART, on FRIDAY, JANUARY 20, at TWELVE for ONE, a CAPITAL SMALL INVESTMENT, producing 10*l.* per annum, subject to 2*l.* per annum, for a term of 78 years from Lady-day, 1860.—Particulars to be had of T. H. STRANGWAYS, Esq. Solicitor, No. 16, King's-road, Bedford-row; at the Mart; and at the Estate Agency Offices, 3, Carey-street, Lincoln's-inn, W.C.

GOSWELL STREET.—TO BUILDERS AND OTHERS.

MR. DEBENHAM will SELL, on the PREMISES, on FRIDAY next, JANUARY 20, at TWELVE, the MATERIALS of FIVE HOUSES, Nos. 2 to 6, Allen-street, Goswell-street, including good stock bricks, tiles, timber in roofs and floors, lead gutters and pipes, doors, stoves, and fixtures, and other useful lots. Catalogues at the Auctioneer's Offices, 80, Cheapside.

Paperhangings, Sheet and Crown Glass, Ironmongery, &c.

MR. TINDALE will SELL by AUCTION, at his Rooms, Grosvenor-street, Commercial-road East, on TUESDAY, JANUARY 17, at TWELVE for ONE, a large STOCK of English and French PAPERHANGINGS, in flocks, golds, satins, chintzes, damasks, oaks, gothic and other staircase, granites, hand and float marbles; register stoves in various sizes, main-water pipes, nails, hinges, bolts, screws, and a general assortment of ironmongery; crown and sheet glass in crates, &c. Catalogues at 1, Portland-place, Commercial-road East.

BUILDING MATERIALS, LITTLE MOORFIELDS.

PULLEN & SON are directed to SELL by TENDER, on MONDAY, JANUARY 16, in one lot, all the BUILDING MATERIALS and FIXTURES of a HOUSE and PREMISES, No. 34, Little Moorfields, and a HOUSE in White-street, adjoining: comprising sound brickwork, pantiles, timber, sashes, doors, partitions, flooring boards, lead gutters and pipes, paving, shop front, stoves, and useful fixtures and fittings-up.—May be viewed and particulars had of PULLEN & SON, 80, Fore-street, Cripplegate; where Tenders are to be sent before FOUR o'clock, on MONDAY, JANUARY 16.

METROPOLITAN IMPROVEMENTS.—Southwark and Westminster Communication.—Second Sale.—Capital BUILDING MATERIALS of a large stack of Hop Warehouses and several Houses and Shops, in High-street, Red Lion-street, and Counter-street, Borough; to be taken down for the new street.

PULLEN & SON have the honour to announce that they are instructed by the Metropolitan Board of Works to SELL by AUCTION, on the PREMISES, on FRIDAY, JANUARY 20, at TWELVE, in lots, all the capital BUILDING MATERIALS, FIXTURES, and FITTINGS-UP of a spacious stack of HOP WAREHOUSES, and nine HOUSES and SHOPS, situate in Counter-street, Red Lion-street, and High-street, Borough, of a superior description, the greater portion having been built only a few years ago: comprising 350,000 capital stock bricks, sound oak and fir timber in stout rafters, plates, joists, and girders; fifty square of excellent slating, 15,000 plain tiles, pantiles, modern sashes, useful doors, panelled and glazed partitions, marble and Portland chimney-pieces and interior fittings, 350 square of sound boarded floors, plate glass shop-fronts, iron bressummers, twenty iron columns, seven square of stone paving, coping, and cills; 180 yards of granite pitching and curb, five tons of lead in gutters, flats, cisterns, and pipes; stable fittings, large folding gates, twelve pair loop-hole doors, stoves, ranges, counters, desks, gas-fittings, crane and wrought-iron jib, and other useful fixtures and fittings-up.—May be viewed the day previous. Catalogues had of PULLEN & SON, 80, Fore-street, Cripplegate.

VULCANIZED INDIA-RUBBER WASHERS, VALVES, HOSE-PIPES, and any other article in INDIA-RUBBER, made to any design for engineering and scientific purposes.

JAMES LYNE HANCOCK,
Vulcanized India-Rubber Works, Goswell-road, London, E.C.

THE ELECTRO PRINTING-BLOCK COMPANY (Limited).

Offices—27, New Bridge-street, Blackfriars.

NOTICE IS HEREBY GIVEN, that all the Shares subscribed for are now ready for delivery, on application to the Secretary.—By order of the Board,
FREDERICK PENNY, Secretary.
January 1, 1860.

THE ELECTRO PRINTING-BLOCK COMPANY (Limited).

Offices—27, New Bridge street, Blackfriars.

The DIRECTORS are now PREPARED to enter into CONTRACTS for the cheap RE-PRODUCTION, on an enlarged or reduced scale, of STEEL or COPPERPLATE ENGRAVINGS, Woodcuts, Lithographs, Maps, Manuscripts, or Pen and Ink Drawings, for the purpose of working either from Stone or Electro-Surface Blocks. Specimens of the work may be seen at the Offices of the Company.—By order of the Board,
FREDERICK PENNY, Secretary.
January 1, 1860.

THE ELECTRO PRINTING-BLOCK COMPANY (Limited).

Offices—27, New Bridge-street, Blackfriars.

Capital, 50,000*l.* in 10,000 Shares of 5*l.* each, to be paid on Allotment.

DIRECTORS.

Augustus Walter Arnold, esq. 59, Harley-street.
William Taylor Copeland, esq. Alderman, and M.P. 160, New Bond-street, and Stoke-upon-Trent.
Frederick Mullett Evans, esq. of the Firm of Bradbury & Evans, Whitefriars.
Herbert Ingram, esq. M.P. *Illustrated London News*, 198, Strand.
Charles Knight, esq. Fleet-street.
Mark Lemon, esq. 85, Fleet-street, and Vine-cottage, Crawley, Sussex.
William Peters, esq. 35, Nicholas-lane, Lombard-street.
S. Leigh Sotheby, esq. F.S.A. Wellington-street, Strand, and The Woodlands, Norwood.

BANKERS.

Messrs. Masterman, Peters, and Co. 35, Nicholas-lane, Lombard-street.

Applications for the remaining Shares to be addressed to the Secretary.

By order of the Board,
January 1, 1860. FREDERICK PENNY Secretary.

DRAINAGE of the CITY of RIO DE JANEIRO.—PAYMENT to the COMPANY, by the BRAZILIAN GOVERNMENT, of a FIXED ANNUAL DRAINAGE RATE for NINETY YEARS.

THE RIO DE JANEIRO DRAINAGE COMPANY, Limited.

Authorized by decrees of his Imperial Majesty the Emperor of Brazil, and by laws of the Imperial Brazilian Legislature. To be incorporated, with limited liability, under the Joint Stock Companies' Act, 1856, and Registered as a Société Anonyme in Brazil.

Capital 650,000*l.* in 32,500 shares of 20*l.* each. Deposit 3*l.* per share.

Interest at 7*l.* per cent. per annum on the paid-up capital during construction; and a minimum annual net revenue of 8½ per cent. secured to the shareholders after completion of the works.

DIRECTORS.

The Hon. T. C. Bruce
John Addis, esq.
John Cater, esq.
Thomas Leverton Donaldson, esq.
Pascoe C. Glyn, esq.
Ross D. Mangles, esq.

BANKERS.—Messrs. Glyn, Mills, & Co.

CONSULTING ENGINEER.—C. Hutton Gregory, esq. C.E.

ENGINEER-IN-CHIEF, RESIDENT IN RIO.—Edward Gotto, esq. C.E.

SOLICITORS.—Messrs. Bircham, Dalrymple, & Drake, 46, Parliament-street.

BROKERS.—Messrs. Hill, Fawcett, & Hill, 29, Threadneedle-street.

A concession has been granted by his Imperial Majesty the Emperor of Brazil, with the concurrence of the Brazilian Legislature, having for its object the introduction into the capital of the empire, of a system of town drainage as prevailing in England.

The concession is for ninety years; the terms are liberal and just, and framed with the view of providing the important city of Rio de Janeiro, the population of which numbers about 350,000, with a thorough system of good drainage, and at the same time of securing a handsome remuneration to those who embark in the undertaking.

The directors have been in communication with the Brazilian Minister in London, who has received instructions from the Imperial Government to give the undertaking every aid and encouragement.

The works to be executed by the Company are declared by the concession to be privileged works of the State, and as such entitled to special facilities and protection.

The concession provides for the drainage of the city in three separate districts; and also for extension of the drainage beyond the limits of the present plan, when the rate to be paid to the Company by the Government for the additional area, shall amount to 9 per cent. per annum on the further outlay. Power will be taken to raise additional capital for this purpose should it be required.

The plans for the proposed works were prepared by Mr. Gotto, C.E., upon a careful examination of the locality, and have been adopted by the Brazilian Government, after having been submitted by them, through His Excellency Le Commandeur de Carvalho Moreira, then and now their minister in London, to Sir Wm. Cubitt, the late Mr. Robert Stephenson, M.P., and the late Mr. Rendel: by whom they were approved and reported upon. A copy of these reports and of the concession may be seen on application to the solicitors or brokers.

Provision (by means of a guaranteed contract with responsible contractors) has been made for completion of the whole of the works (including the drainage of 14,891 houses) for a sum which, together with the cost of the Concession, including the original surveys, detailed and other drawings, and preliminary expenses (85,000*l.*), and with engineering, administration, and all other charges during construction, both here and in Rio, as also interest at 7 per cent. per annum on Calls during the progress of the works, will fall within the capital of 650,000*l.*

The Brazilian Government is bound, by legislative enactment, to pay to the Company 42 milreis per annum, which, at the par of exchange of 27d. amounts to 4*l.* 14s. 6d. for every house now erected or hereafter built within the three districts during the term of the Concession, such payment to be made half-yearly for all the houses, whether occupied or not.

The number of houses, according to the last returns, amounted in June, 1859, to 13,739; and adding the average number of houses yearly built in the City, there will be, on the completion of the works (within the three districts) at least 14,891 houses (the number provided for in the Contract) from which the revenue of the Company will arise.

The amount to be received upon 14,891 houses will alone produce a gross income to the Company of 70,360*l.*

In addition to the above drainage payment on houses, the Municipality of Rio is bound to pay a yearly sum of 12,000 milreis (1,350*l.*) for cleansing and maintaining in working order the rain-water sewers.

As regards the annual working expenses, a guaranteed contract has been entered into with the same contractors who are to execute the works, for keeping them in perfect repair, and for working the system for a period of twenty-one years, for a sum of 11,000*l.* per annum, leaving only the administration charges to be added, and thus securing a clear net income exceeding 8*l.* 10s. per cent. per annum on the capital of 650 000*l.*

To the above must be added the important profits to accrue to the Company from the exclusive right, which the concession accords, of executing on account of the house proprietors and municipality, and at their expense, all extra drainage works connected with the houses and city. The growing commercial and social importance of Rio, and the rapid increase of its population, renders it obvious that the profit arising from this source must be considerable.

As the number of houses increase in the three districts, additional capital for draining them will be raised (the option of taking that capital being reserved to the shareholders), and thereby a further additional per centage will attach to the whole of the capital invested in the undertaking, inasmuch as the main outlet sewers are included in the contract already entered into.

Applications for shares are to be made in the annexed form, addressed to the Brokers, but no application will be considered unless accompanied by the receipt of Messrs. Glyn, Mills, and Co. for 1*l.* per share on the number of shares applied for. This deposit will be returned in the event of the application not being acceded to; and, if an allotment is made, it will be applied towards the deposit of 3*l.* per share then payable.

Temporary Offices, 24, Old Broad-street, E.C.

FORM OF APPLICATION FOR SHARES.
TO THE DIRECTORS OF THE RIO DE JANEIRO DRAINAG COMPANY, LIMITED.

GENTLEMEN,

I request you to allot me Shares, of 20*l.* each, in the proposed undertaking, and I accept the same or any less number that may be allotted to me, and agree to pay the Deposit of 3*l.* per share allotted; and in the event of my failure herein, I agree to forfeit the Deposit now made, and I authorise you to cancel the allotment, or to enter my name in the Register of Shareholders.

Name.....
Profession or Business.....
Address.....
Date.....

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BONUS of 1861.—All Policies effected prior to the 1st July, 1861, on the bonus scale of premium, will participate in the next division of profits.
ROBERT TUCKER, Secretary and Actuary.

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